

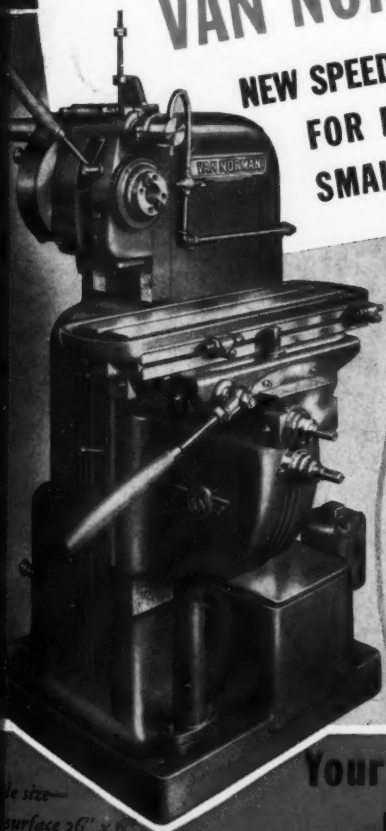
# MODERN Machine Shop

August, 1939

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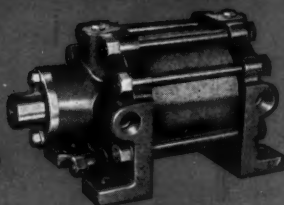
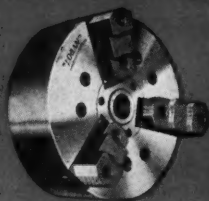
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# MODERN Machine Shop

HOWARD CAMPBELL, Editor

Volume 12

AUGUST, 1939

Number 3

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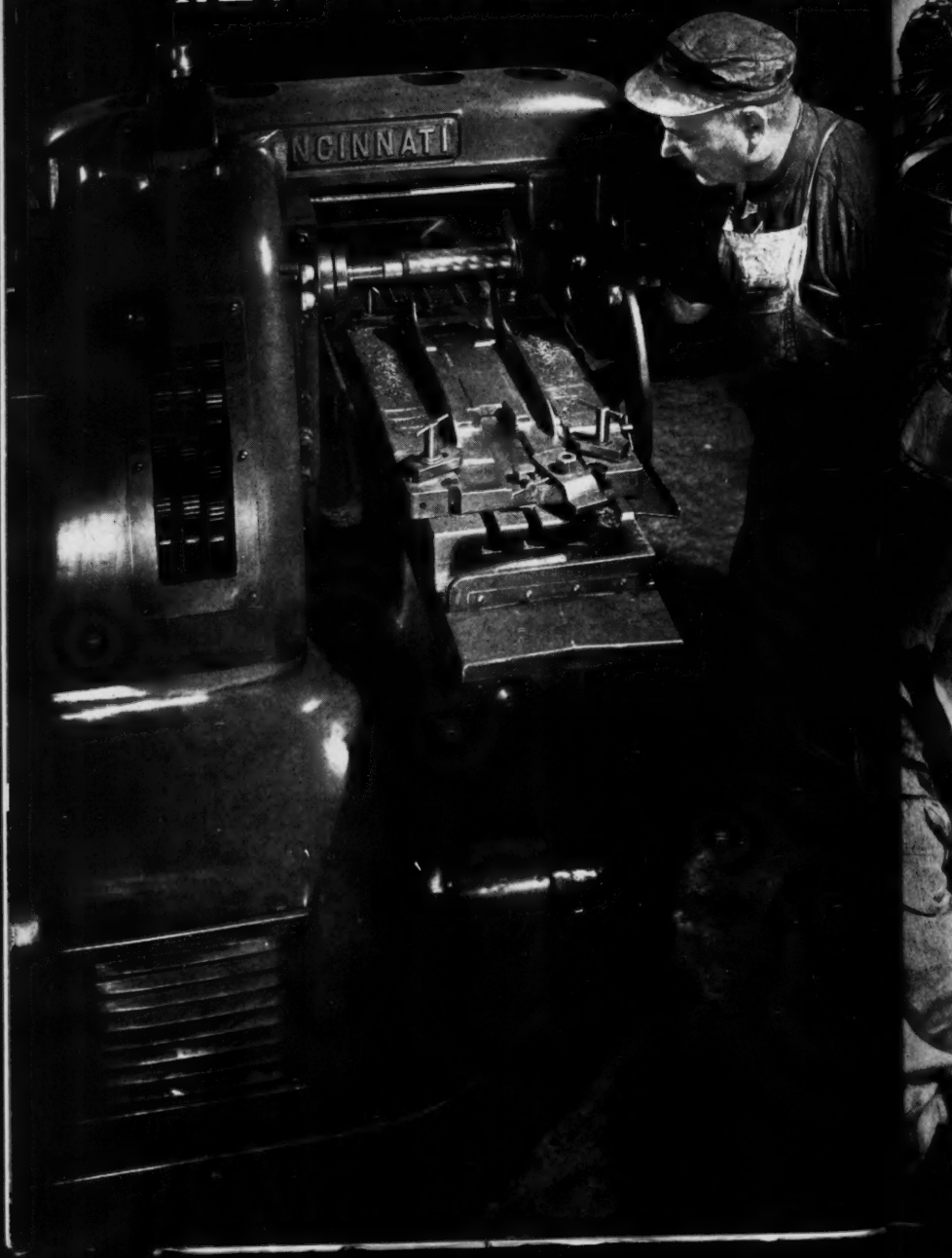
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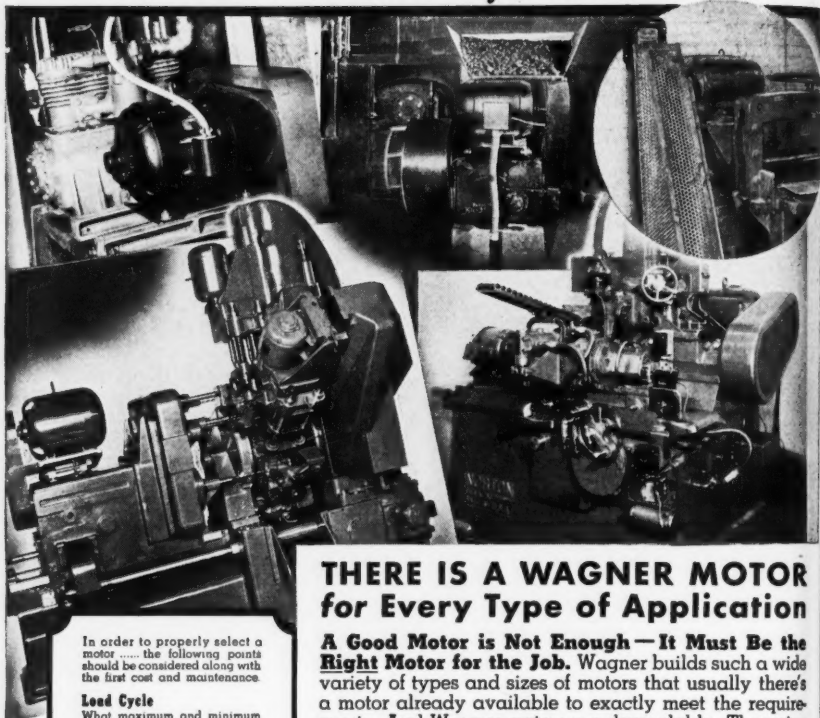
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MODERN MACHINE SHOP

August, 1937

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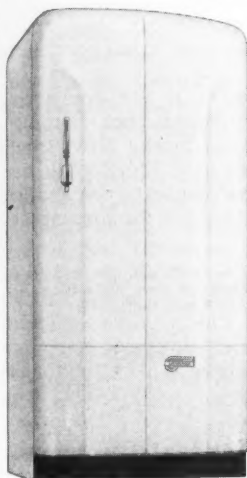
August

# MODERN Machine Shop

CINCINNATI, OHIO

AUGUST, 1939

VOL. 12, No. 3



## Machining Parts for Westinghouse Refrigerators

*The building of the modern electric refrigerator involves operations of an unusual variety and extraordinary precision. Some of these operations are described in this article.*

By HOWARD CAMPBELL  
Editor, MODERN MACHINE SHOP

THE refinements of modern manufacturing are nowhere better exemplified than in the machining of parts for and the construction of the modern household electric refrigerating unit, especially where production is great enough to make possible the design of special tools and fixtures and the use of machines and tools

especially adapted for the operations upon which they are used. The Springfield, Mass., plant of the Westinghouse Electric & Manufacturing Company affords an excellent example of the type of manufacturing referred to. Some of the more interesting operations in this plant will be described and illustrated here.

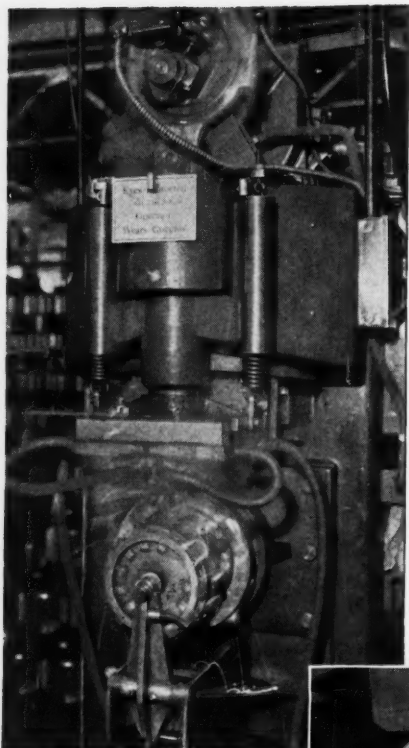


Fig. 1 (Above)—Spot welding fins to compressor shell for Westinghouse refrigerating unit. The operation is automatic, the shell being indexed and the ram carrying the electrode being operated vertically by automatic mechanism.

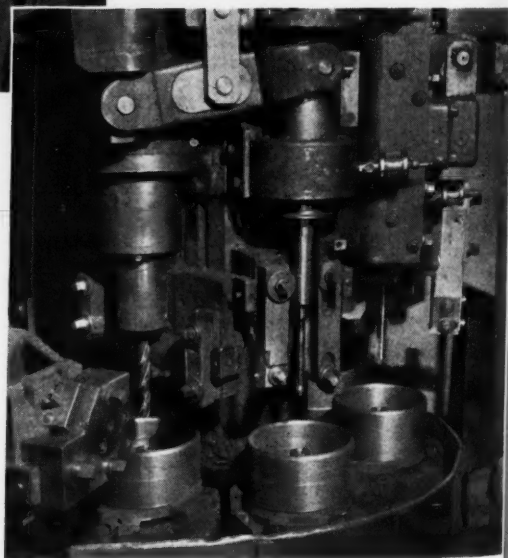
The illustration Fig. 1 shows the Thompson-Gibb welding machine used to spot weld the fins to the compressor shell. There are nine fins to a shell, each fin being welded at eight points at each stroke of the machine. The descriptive word "stroke" is used because the welding contact is made through

the use of a ram which is operated vertically by means of a crankshaft at the top of the ram. The picture is not entirely clear, due to the fact that the photograph was taken just as the ram completed a stroke.

The shell and fins are held together in a fixture which holds the work in a horizontal position so that it can be indexed to bring the fins successively to welding position under the ram, which is automatic with the operation of the machine. Two fixtures are used; thus the operator is unloading and loading one fixture while the other one is in operation in the machine.

The housing for the compressor unit, which is of cast iron, is turned, bored, and faced in the New Britain automatic shown in Fig. 2. The machine is of the vertical type and has six stations which for the present task

Fig. 2 (Below) — Housings for compressor units are machined in this six-station New Britain automatic.



are used as follows: (1) Load; (2) First rough turn halfway on inside and outside diameters; (3) Turn and drill the hub; (4) Finish rough cut; (5) Bore and finish turn the hub; (6) Finish turn, bore, and line ream the hole. A compressor housing is finished complete in one minute and four seconds.

The end of the compressor housing has several bosses which must be finished to meet definite specifications for smoothness and accuracy. This operation is performed in the Cincinnati broaching machine shown in operation in Fig. 3. The machine is a double broach; that is, two slides are provided for the face broaching tools so that, while one tool is cutting, the slide on the other side can be reversing to operating position and the operator can be changing work in the second fixture. Removing  $\frac{1}{8}$  in. of stock at a cut, using one broach only, the ends of the housings are machined at a rate of 194 pieces per hour. This production is, of course, increased considerably when two broaches are used.

In designing and machining parts for such a small refrigerating unit as is found in the household refrigerator, one point has to be kept in mind—and that is that all fits must be practically perfect in order to build up and maintain gas pressures, assure smooth and noiseless operation, and provide for years of smooth and

trouble-free operation. In line with this statement, the illustration Fig. 4 shows the operation of honing an end bearing in a compressor housing. A four-stone hone is used, the stones being of fine grade, and the hone revolves at a high rate of speed while



Fig. 3—Using one broach only and removing  $\frac{1}{8}$  in. of stock at a cut, housings are faced at a rate of 194 pieces per hour.

reciprocating vertically. Removing approximately 0.002 in. of stock, this bearing hole is honed within 0.0003 in. of the size specified on the drawing.

The little steel pistons that are used in the compressor are not only turned and ground to size on the diameter, but must also be ground on



Fig. 4—The bearing hole in the housing is honed within a limit of 0.0003 inch.

the heads in order to produce the exact amount of compression required in the unit. The heads of the pistons are ground on the Heald surface grinder shown in Fig. 5.

To hold the pistons in place for grinding, a circular plate fixture is used which carries plugs that are drilled and tapped to take the screws by which the pistons are as-

sembled to the compressor unit and the pistons are anchored to the fixture by means of these same screws. In the illustration the operator can be seen placing one of the pistons in position over one of the plugs. The fixture holds 30 pistons. Removing approximately 0.010 in. of stock from the head, the 30 pistons are finished to length in from 10 to 12 minutes.

One of the parts that is depended upon for efficiency in the compression of the gas is the valve plate, which must be almost as smooth and accurate as a Johansson gage block. To obtain this smoothness and accuracy, the valve plates are lapped in the Norton Hyperslapping machine shown set up for operation in Fig. 6. The plates are held in a fixture made from a steel sheet in which are holes cut for six holders, each of the holders made to

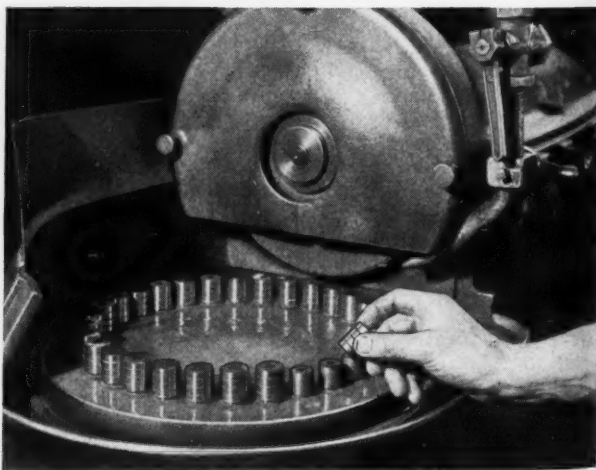


Fig. 5—Compressor pistons are finished all over, heads being ground in this Heald surface grinder.



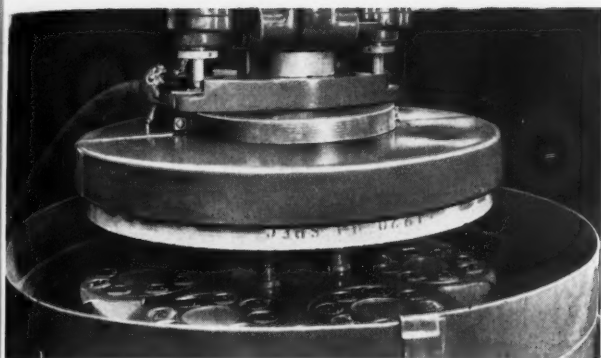


Fig. 6—The perfect surface and accuracy required on the valve plates is obtained by lapping them in a Norton Hypo lapping machine.

In the first roughing cut, 0.015 in. of stock is removed, 0.005 in. in the second roughing cut, and 0.003 in. in the

third roughing cut, leaving 0.002 in. for finish. After hardening, the final grinding operation is performed, removing the last 0.002 in. of stock and finishing the shaft diameter to 0.7487-0.749 in. Production on complete pieces is approximately 70 shafts per hour.

The steel pistons are also finished to size on the diameters by grinding in the centerless grinding machine. The pistons are passed through the roughing machine six times and the finishing machine once, removing from 0.003 to 0.006 in. on each of the roughing operations and 0.001 in. in the finishing operation. Production

hold eight pieces. The fixture rotates on an eccentric, which prevents wearing the lapping wheel at any one point and assures the maximum accuracy in the parallelism of the work surface.

Approximately 0.00075 in. of stock is removed from each side, the pieces being reversed between operations; thus the total amount of stock removed is 0.0015 in. and the 48 pieces are finished in from 10 to 12 minutes complete.

The crankshaft for the compressor unit, although designed with a flange at one end, is ground to size in a Cincinnati centerless grinder as illustrated in Fig. 7.

Three roughing operations are performed on the shaft, then it is sent to the heat treat department and hardened, after which it is returned to a centerless grinder for the finish grinding operation.

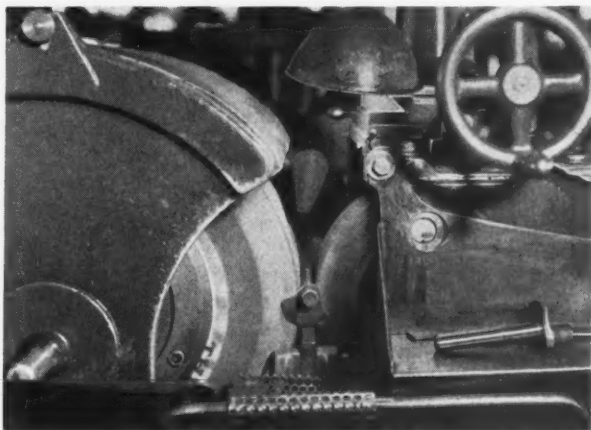


Fig. 7—Grinding crankshafts in a Cincinnati centerless grinding machine.



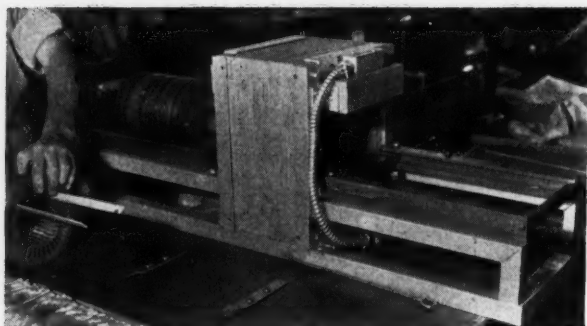


Fig. 8—This unique contraction instantaneously separates the stator stampings so that they can be cleaned on both sides in the automatic cleaning machine.

separator the stampings are separated from each other by electric repulsion.

The separator is built up of 941

of finished pistons is approximately 200 per hour.

Stator "iron," or field stampings, are punched from sheet iron that carries a thin film of oil both to prevent rust and to aid in feeding the work through the machine. When the stampings are assembled to the motor they must be clean, consequently they have to be cleaned before they reach the assembly. The cleaning operation is performed in a Detrex solvent degreasing machine, but the operation of cleaning stator iron is complicated by the fact that, as the stampings are flat, they adhere to each other due to the oily surfaces. Separating these pieces so that the cleaning fluid can reach both sides of each piece has, in the past, presented quite a problem, but the problem has been solved in this plant by the use of the separator shown in Fig. 8. In this

pieces of 0.017 in. silicon iron 11 x 1½ in., and 941 pieces of 0.017 in. iron 8½ in. in size with a 6¼ in. box. Fish paper, 0.010 in. thick, is used between the layers. The coils are made of 363 turns of No. 17 single



Fig. 9—All small parts are thoroughly cleaned by passing them through this automatic Detrex degreasing machine.

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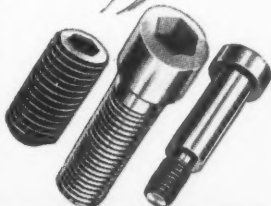
## "16 POINT QUALITY-CONTROL" Leads Critical Buyers to Demand PARKER-KALON

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Fig. 10—Each valve seat is inspected under a powerful microscope to ensure that all valves used are free from imperfections.

cotton enamel wire per coil.

To operate, the stator iron is stacked 8 in. deep and two slides are inserted through the winding slots in the iron as shown at the left in the illustration. The iron is suspended on these slides by means of a holder which can be moved into position in the square hole in the separator. When the current is applied, the stampings immediately fly apart, ranging themselves the full length of the holder and no two in contact. With the iron in this position the holder is swung on hangers on the conveyor

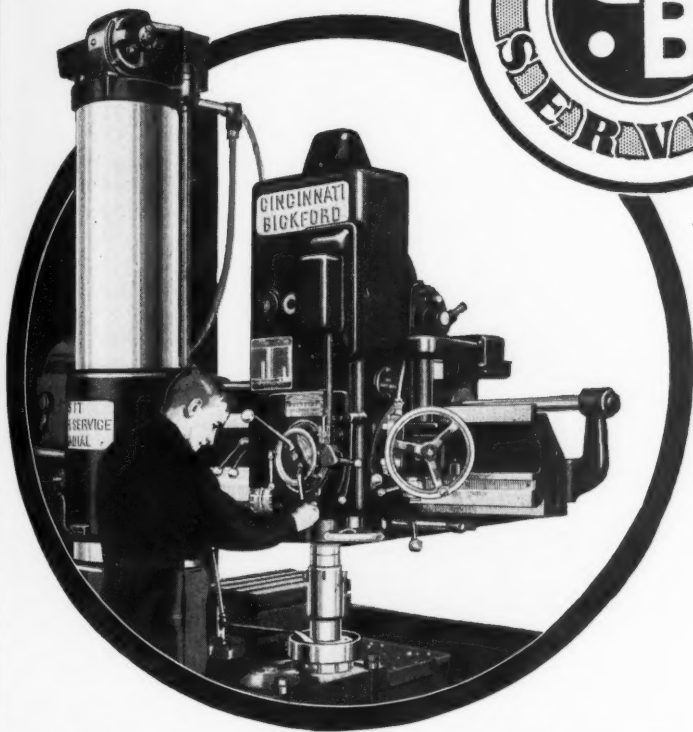
in the machine and the stampings are passed through the spray, cleaning them thoroughly.



The small metal parts are cleaned by passing them through a solvent spray in the Detrex machine shown in Fig. 9. The machine has a built-in conveyor upon which the individual parts are hung, if they are large enough, and upon which the metal baskets are hung which are used when the parts are

Fig. 11—The wristpin must be a push fit in the connecting rod bearing. This inspector is gaging the bearings and selecting pins to fit.

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small. The conveyor passes the work through the line of spray and finally through a hot water rinse at a speed just fast enough so that the parts are thoroughly cleaned and dried before emerging from the machine again.

To ensure that the parts that go

interfere with the efficient operation of the compressor. A very light scratch might pass unnoticed if the eye were depended upon alone, but the operator inspects the valves under a Bausch & Lomb instrument which has a magnification of 20 times; thus the very lightest of scratches or imperfections are easily visible. The instrument was adapted for this job by Westinghouse engineers.

In Fig. 11 an operator can be seen inspecting connecting rods and selecting the pins which fit the rods. At the left of the operator is a rack of pins which have been selected and racked according to size. As each connecting rod is inspected under the Sheffield gage and tested for the size of pin required, the pins are selected, inserted in the proper place in the rod, and the assembly is placed in a rack to be forwarded to the assembly department. There are eight different sizes of pins, varying by ten-thousandths of an inch in size. In inspecting the hole in the large end of the rod, a



Fig. 12—Pistons are inspected with a Zeiss amplifying gage and then are segregated according to size and marked with an electric etching pencil.

into a Westinghouse unit meet the specifications of the engineering department, the parts pass through an inspection department in which each individual piece is examined for accuracy and workmanship. Special gages are used where necessary, and in cases where finish is important, special high power magnifying instruments are used similar to the one shown in Fig. 10.

In Fig. 10 is shown the inspection of valve seats for possible scratches or other imperfections which might

go and no-go gage is used which allows a variation of 0.0002 in. The small end must be a push fit for the pin.

Pistons are inspected for size and finish with the aid of the Zeiss amplifying gage shown at the left of the operator in Fig. 12. Each piston is gaged for diameter and out-of-round, the included tolerance on both being 0.0002 in. Inasmuch as the gaging instrument magnifies 500 times, any variation in diameter or out-of-round can easily be seen. The

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exact size of each piston is marked on the head with the aid of the Luma electric etching pencil shown in use. With this instrument the numbers are marked on the metal as easily as writing on paper with a pencil.

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on the Johnson complete bronze bearing service. New and simplified catalog indexing features facilitate the selection of bearing types and sizes. Valuable information on bronze bearing alloys, tolerance and large range of sizes listed progressively make this catalog indispensable in the selection of the correct bearing for any application.

The Johnson Bronze Catalog 380 comes to the reader completely illustrated and affords a comprehensive guide with Progressive Size Listing of Johnson General Purpose Bearings in 800 stock sizes, machine finished ready for assembly, over 350 sizes of Johnson Universal Bronze Cored and Solid Bars, over 200 Sizes of Johnson Electric Motor Service Bearings, individually illustrated, described with necessary specifications throughout and listed in both Alphabetical and Progressive sizes, Johnson Lead-Base and Tin-Base Babbitt and Johnson Cast Bronze Graphited Bearings and Plug Type Bearings.

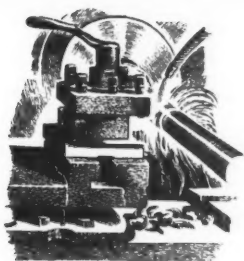
Other important features of Catalog 380 are special sections on Oil Grooving, Flanged Bearings and Bushings, an attractive Decimal Equivalent Chart and convenient listing of Johnson Sales Offices and Warehouses. Catalog 380 also explains an unusual consulting service through the competent Johnson Bronze Staff of Engineers and Metallurgists available at all times in solving bearing problems. Copy free upon request.



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# Modernization of Power Drives, II

## *Improving Drive Operation---Reducing Power Losses---Power Factor and Uses of Capacitors*

By FRANK E. GOODING

THE improvement of existing drives, at an economical cost, in order to take advantage of planned drives presents a problem with which many plant managers are familiar. It is much simpler to plan the drives along with the machine layout before the machines are installed, perhaps before the plant structure is designed, and this point should be kept in mind by the planning engineers of firms who are contemplating new plants or additions.

It is usually better to erect the

plant to enclose the planned machine layout than to build a plant and then try to fit the machines into it. Of course, the amount of space available, limitations imposed by existing structures, or other conditions often necessitate a compromise. However, a better and more suitable plant results when the planning is done on a drafting table than can be obtained by waiting until after the building is finished before starting to plan the equipment layout. The same is true of the drives.

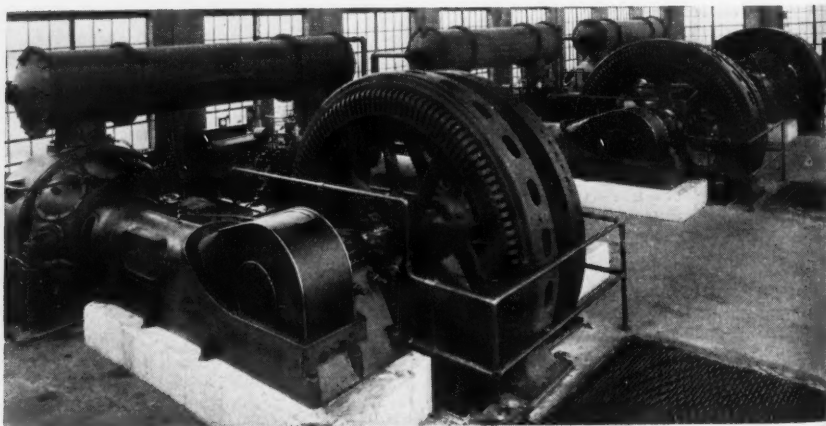


Fig. 1—Three 800 h.p., 75 per cent power factor, 150 r.p.m. Westinghouse synchronous motors driving gas compressors.

This discussion, therefore, will take up (1) what can be done to improve the operation of drives on existing installations, and (2) considerations in drive planning for plant additions or in connection with radical changes in layout, arrangement, equipment, or product to be manufactured.

### Small Groups

As stated in the previous article of this series, one of the most common faults in group drive installation is that the groups are too large, with entirely too many machines dependent upon a single drive. During the depression and in slack production periods the entire group is under power, although only a few machines may be in use. The result is a waste of power and lubricant. In most cases plant managers cannot afford to make changes when production is at a low ebb, and when production increases, the need is less urgent.

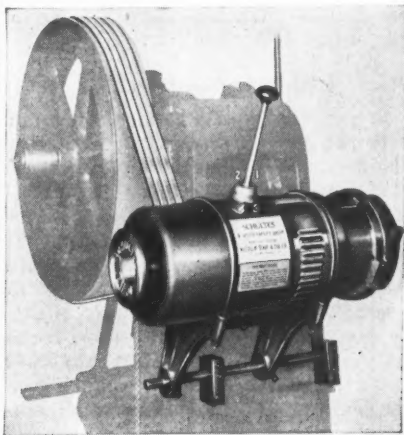
What can be accomplished at a minimum of expense is well illustrated by the changes made in a Chicago plant which manufactures a line of scientific equipment used in industry, hospitals, and various institutions.

The product is produced in several sizes and models, all subject to many variations in order to meet customers' specifications, and so is manufactured largely on order. During slack periods, manufacturing quantities on parts orders sometimes run as low as two pieces and seldom over 100, with an average of 25 parts per order. Such short runs necessitate excessive tool and jig changes, with much idle machine time. This is, of course, an extreme manufacturing job shop condition.

The machine shop contains about 50 machines; mostly lathes, drill presses, and milling machines powered as a group, and 11 newer machines individually driven. Under the

## 4 SPEED SCHULTES UNIT

Instant Reversibility



### Features:

For lathes, shapers, milling machines, drill presses, punch presses, etc.

One lever controls 4 speeds.

Instant reversibility with all 4 speeds.

Adapted to flat-belt, chain or direct drive.

Hand wheel permits rotation of machine spindle for set-up work with complete safety.

Cradle adjustment permits the unit to be revolved to any desired position... placing gear shift lever where most convenient.

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previous arrangement all belted machines were driven by a single motor from five lineshafts, including the main shaft, to which the other four were cross-belted. The machines were grouped according to the type of machine; all the drill presses in one group, all the millers in another, and so on. This plan necessitated considerable trucking of work from one machine to another.

### Modernization Program

When the planned modernization was put into effect, each of the five lineshafts was provided with an individual motor, to which it was connected by an encased silent chain. In addition, the machines were re-grouped so that each group included lathes, milling machines, and drill presses, the machines most frequently used being grouped together. Some of the individually-powered machines were located adjacent to belt-driven machines, but, in general, such machines were paired off or located about the floor where they are easily accessible for work from all groups.

Under the present arrangement, work can be routed to machines in the groups that are in operation while the rest of the machines remain idle. Only as many machines as are needed are in operation at a time. This arrangement has the further advantage that work can be passed to an adjacent machine for subsequent operations, eliminating much of the trucking and handling.

Altogether, this new arrangement has proved much more satisfactory from a production and operation standpoint than the single group. An important consideration is that the group of machines selected for use may be varied to correspond with the number of men employed. Also, an additional group can be added or shut down at any time. Machines

not in use do not require power, lubrication, or other servicing.

By being able to shut down machines that are not in use and keep the machines that are in operation busy for a larger percentage of the time, a better power factor is obtained than when a large group is under power with only a few machines in use. Again, it is necessary to keep only a single motor on hand to provide against motor failure.

Each machine could have been equipped with a motor for individual drive, of course, but this plan would have resulted in a much larger expenditure. As the management has adopted the policy of ordering individual drive with each new machine purchased, the immediate problem was concerned with improvement of existing equipment at the lowest possible expense. As belt-driven machines are replaced, some of the group lineshafts will be dismantled.

There are many plants with large group drives in which the groups can be subdivided into smaller groups, with or without changing the arrangement of the machines, to very good advantage both from power transmission and operating standpoints. Wherever lineshafts are cross-belted together, the extreme outer lineshaft usually operates at a lower speed than the main shaft, due to power losses in transmission. As machine speeds are usually rated on a supposedly fixed lineshaft speed, any loss in the base speed decreases production by that amount.

### Loss Sources

Belt slippage is a common source of power loss in group drives. Computations for speed are sometimes based on the no-load speed rating of the motor, such as 1,200 or 1,800 r.p.m. Full load speed, however, is 40 to 60 r.p.m. slower which, on a



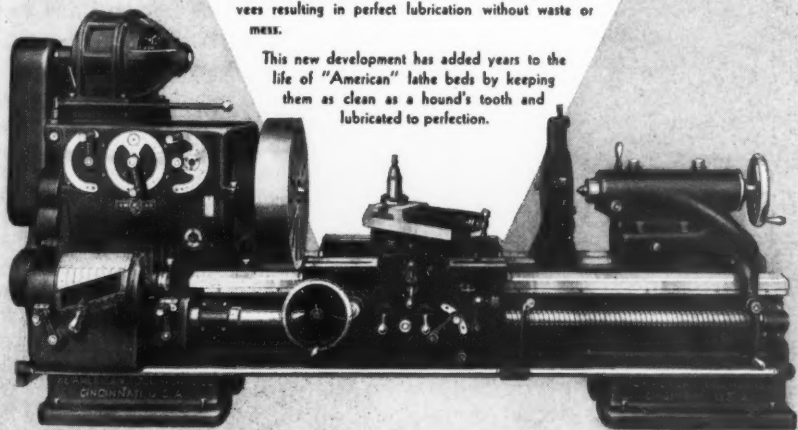
## And Now . . . a new **SHEAR WIPER** that really *does* the trick

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In addition, a felt insert backs up the scraper edge and distributes filtered oil positively and uniformly over the vees resulting in perfect lubrication without waste or mess.

This new development has added years to the life of "American" lathe beds by keeping them as clean as a hound's tooth and lubricated to perfection.



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4-to-1 reduction, results in a lineshaft speed of 10 to 15 r.p.m. less than desired.

Any improvement program should

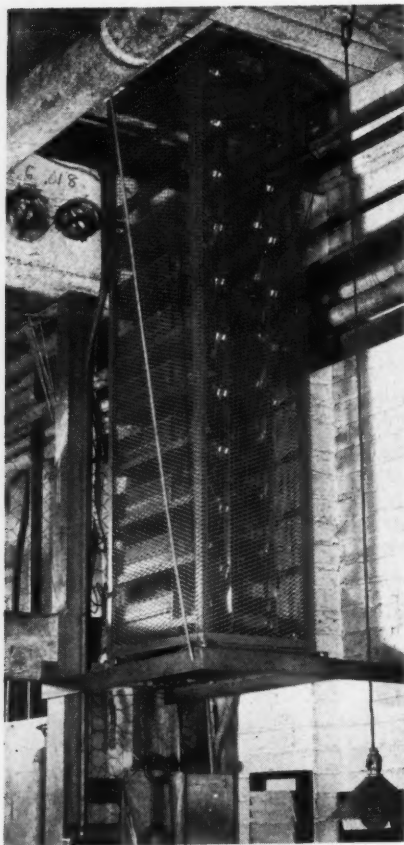


Fig. 2—General Electric small rack-type capacitor, 80 kv-a., in plant of United Steel and Wire Co., Battle Creek, Michigan.

include checking the actual operating lineshaft speed when loaded. Correction may be obtained by increasing or decreasing main pulley diameters to provide a more nearly correct speed. Sometimes "lagging" the motor pulley is sufficient. Usually a

slight increase in lineshaft speed will be advantageous in bringing the production machines up to the proper rating and increasing production accordingly.

Alignment of lineshafts is often faulty and commonly neglected. In some plants it is the practice to check alignment at least once in every two years on all lineshafts mounted on wood stringers or in so-called "mill-type" buildings. Wherever a lineshaft has an exceptionally heavy starting load, misalignment is probably at fault.

Worn clutches on lineshafts or cut-off couplings are frequent sources of power loss. In one case where a graphic meter reading indicated an exorbitant starting load and frequent sudden but momentary peak loads, the trouble was traced to a defective clutch. The clutch was replaced and no further trouble occurred. On new installations, clutches should be built into the machines so that they can be adjusted and repaired without shutting down the lineshaft and thus the entire group of machines.

### The Power Factor

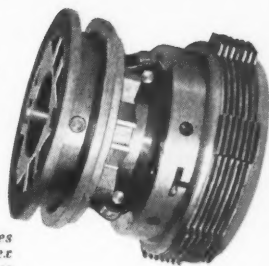
With the abandonment of individual power plants and the more general use of power supplied by power companies, the "power factor" has become of increasing importance. Motors of the type commonly used require current for two purposes; first, to magnetize the coils and thus get the motor started to operating, and second, to pull the load. Only the second class of current registers on the meter and only the current registered is paid for, but the user pays for all the current that goes into his motor in just the same way that a purchaser of stampings is charged enough for the finished pieces to cover the cost of the material that goes into "scrap."

The amount of current used for



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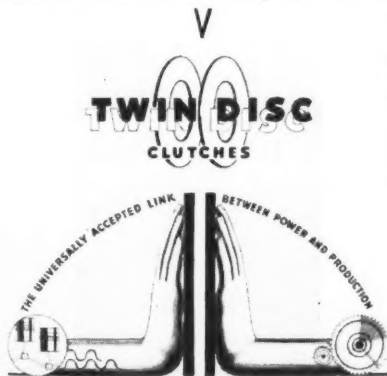


*Twin Disc MT (oil type) clutches are furnished in single or duplex models. The duplex is two clutches in one—one clutch being used either for reverse or as a brake. Dry type models are also available.*

● Where frequent clutch engagement is demanded, Twin Disc MT (oil type) clutches are preferred. Driving plates are hard phosphor bronze, perforated with oil release holes. Driven plates are saw steel, heat treated and ground with radial grooves for oil release.

This assures not only smooth engagement, high torque capacity with comparatively low operating pressures, but faster frictional heat dissipation . . . a minimum of lag or drag between plates when the clutch is disengaged.

Twin Disc Clutch Company's 22 years studied development, of built-for-the-job clutches, takes into consideration both work and load factors, as well as precision engineering. The new Twin Disc MT clutches provide an excess in safety and performance that gives added value to any machine tool in which they are used.



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magnetizing purposes varies but little, irrespective of the amount of "load" or pay current used. Thus when motors are operated below their maximum capacity, or under-loaded, the percentage of magnetizing current to load or pay current increases. In other words, an excessive amount of current is being used for which the power company receives no pay. Public utilities object, naturally, to supplying the extra percentage of magnetizing current for under-loaded motors and therefore impose a penalty for low power factor and grant a premium or bonus when the power factor is high.

Not all public utilities impose power factor penalties, but it is not impossible that they may be required to do so in the interest of conservation of energy as a result of the National Defense Program. And even though a plant generates its own power or receives no penalty for low power factor, there is no justification for neglecting efforts toward improvement. A low power factor indicates a waste of generating and distributing facilities, regardless of who supplies the current.

### Improving the Power Factor

Since low power factor is a direct result of under-loaded motors, one of the best remedies consists in laying out drives so that motors will be well loaded. Group drives in machine shops may be designed to operate at 70 to 85 per cent of rated motor capacity. Individual drives, on the other hand, often operate at a much lower percentage of full load capacity, with correspondingly lower power factor.

Where a low power factor cannot be corrected satisfactorily by properly grouping or regrouping machines, or where it is desirable to raise the power factor in order to avoid a penalty or merit a bonus,

correction is often obtained by the use of synchronous motors. These motors are usually applied to drive air compressors, plating or other generators for direct current, or other units which use relatively large amounts of power and operate at or near full load much of the time but without overload.

The synchronous motor, where planned as a part of the original installation, is a very satisfactory and economical aid in correcting the power factor. Where synchronous motors must start under very heavy load, say 140 per cent of normal load, special design is necessary. Accordingly, they are not commonly used on lineshaft drives.

### Capacitors

Where it is desirable to improve a low power factor without making use of the equipment to carry a work load, either a synchronous condenser or a capacitor may be used advantageously. In most cases, however, the capacitor will be found best. Advantages obtained by the use of a capacitor include (1) low losses; not greater than  $\frac{1}{3}$  per cent; (2) no operator or special attention required; (3) unit construction, making it possible to add units as power requirements increase; (4) ability to locate at point of load or demand; (5) equipment is light in weight, requiring no foundations, and may be installed overhead or out-of-doors, thus saving floor space; (6) improvement in voltage along with power factor correction; (7) ease of installation, and (8) fact that installation will pay for itself in from one to three years in most cases.

Which type of equipment to use for correction in any one case depends upon the circumstances, and should be decided by an experienced engineer. On new installations, synchronous motors or synchronous con-

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August,

# 12 Drill Press Spindles FOR THE PRICE OF 4

## How A Machine Shop Superintendent Saved \$800

A machine shop superintendent came from the West Coast to buy a four-spindle drill press and was prepared to spend about \$2000 for it. The works manager of a Milwaukee factory told him about Delta drill presses. After a thorough examination of Delta machines, he bought *THREE* four-spindle Delta Drill Presses and saved \$800. In other words, he sent back to his factory twelve spindles for *LESS* than the cost of four! This is only one instance out of hundreds where plant men are saving thousands of dollars through the use of Delta industrial drill presses.



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densers may be more economical. Usually, however, capacitors are more economical for existing installations.

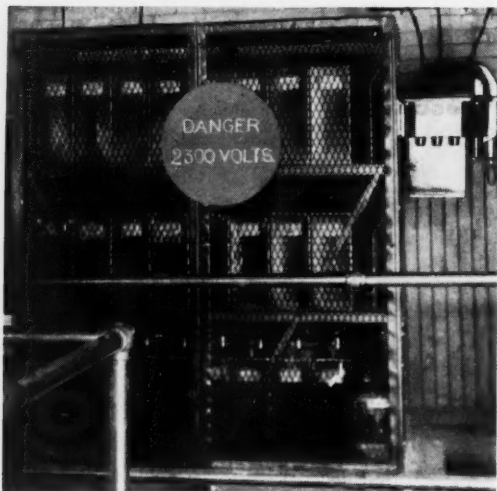
That power factor is an important element of expense is shown by the experience of a firm that manufactures small tools. The equipment consists of approximately 40 machines requiring motors rated from

Regular, systematic, competent servicing are necessary for uninterrupted and economical operation of any type of power drive. This is most efficiently handled by laying out a definite schedule for oiling, inspection, cleaning, and overhauling for all equipment, with men definitely assigned to carry out the schedule and report on the state of the equipment. By this method, bearings that are running warm or other incipient troubles are discovered and can be corrected before an expensive breakdown occurs.

Modern, carefully-aligned and steel-mounted lineshafts with anti-friction bearings require lubrication only from two to four times a year with a recommended check on alignment from six months to a year after installation and every three or four years thereafter.

On individual drives, motors should be cleaned (blown out) and should be checked for lubrication and heating at periods of from two weeks to a month, depending upon the conditions of dust or dirt under which the motors are operated. At the same time the electrician should check loose, worn, or arcing control connections.

Individual motor drives often require short center belts, chains, speed reducers, gear trains, variable speed transmissions, couplings, clutches, or other mechanical elements not ordinarily required in lineshaft drive groups, most of which also require periodic inspection and servicing. It is good practice for the electrician to be made responsible for the operating condition of these mechanical accessories as well as for the electrical drives.



Westinghouse capacitor bank, rated at 240 kv-a., as installed in plant of Fairbanks Scale Company.

1 h.p. to 35 h.p. and about the same number with fractional horsepower motors. All machines are individually driven and most of them are powered to work on steel; thus when they are working on soft metals, they may be under-loaded.

To correct the condition thus set up, the necessary capacitors were installed. The saving made by the use of the capacitors averages about \$150 per month on power factor penalty per shift, with the plant operating 1½ to 2½ shifts most of the time. This installation paid for itself in about fifteen months.

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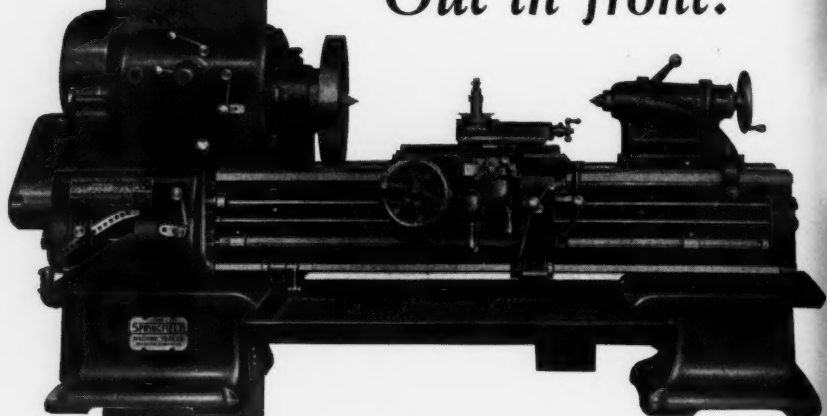
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August, 1939

MODERN MACHINE SHOP 63

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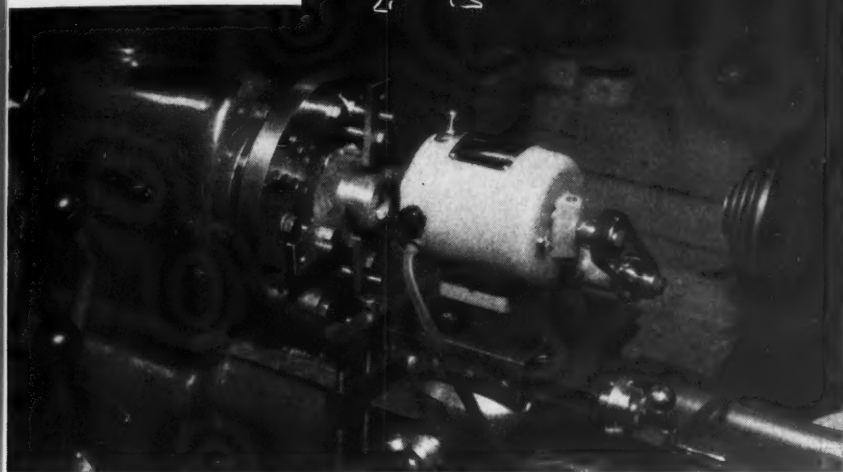
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accuracy of .0001". Weighing but 6½ lbs., with a universal 1/14 H.P. motor and a top spindle speed of 19,000 R.P.M., Tom Thumb's the answer to the shopman's prayer for a small, internal-external precision grinder. Ask your industrial distributor for a demonstration; no obligation.

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# On the Crosley Assembly Line

By JAMES BECKMAN



**A** GAIN the theory that the present-day motor car is much too large, too heavy, and too high-powered for the average task required of it has been crystallized by an American manufacturer, and an automobile of smaller dimensions, lighter weight, greater economy, and designed to operate at a slower rate of speed than the average car of today is be-

ing built for the American market. Built by the Crosley Corporation of Cincinnati, Ohio, the car is 120 inches in length overall and 47 inches in width, with a wheelbase of 80 inches and a 40-inch tread. The height, with top, is 56 inches and the weight is 900 pounds.

The Crosley car body is manufactured from heavy standard body-



The receiving end of the conveyor line, to which the bodies are transferred as they come from the body plant.

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Transferring a body to the overhead conveyor line. In the second half of its journey the body is conveyed on a superstructure high enough so that the workmen can work under it without cramping.

gauge steel, and the top, which is of the "one-man" type, is composed of three plies — two of fabric and one of rubber. The top is black and the colors of the body vary. Maximum width for the size of the car is obtained by the elimination of the usual running-board.

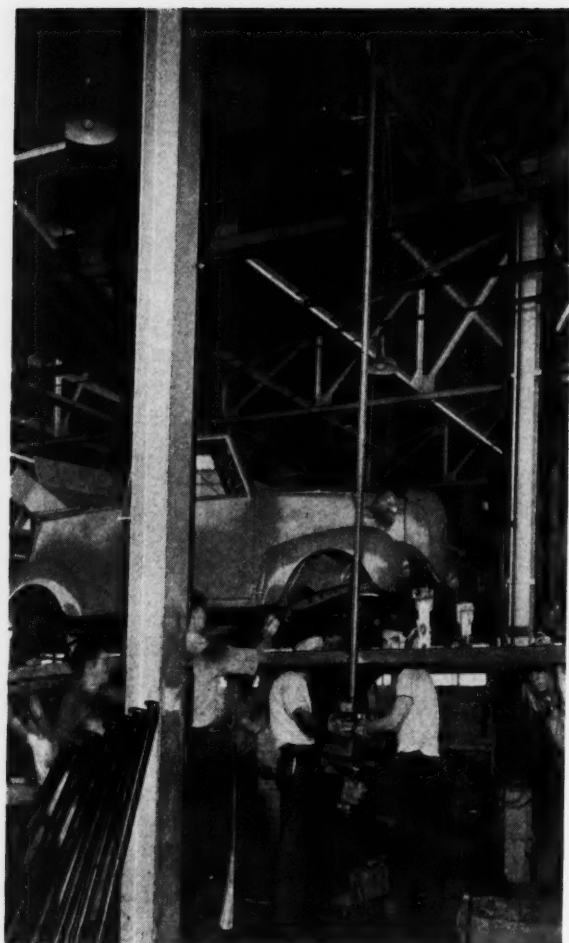
The power plant consists of a two-cylinder opposed, aviation-type, four-cycle, air-cooled motor which is built for the Crosley Corporation by the Waukesha Motor Company. With a 3-inch bore and 2 $\frac{1}{4}$ -inch stroke, the SAE horsepower rating is 7.2 and the developed horsepower is 15.5.

Power is transmitted through the conventional type of transmission — three speeds forward and reverse. The transmission is similar to the

larger transmissions used in other automobiles, but is scaled down in proportion to the weights and loads applied. The clutch is conventional in design, but again is scaled down in proportion to the work that is expected of it.

The car is assembled at the Crosley plant in Richmond, Ind., to which the parts are shipped from other Crosley plants and from suppliers. The body, complete with the frame, comes to this plant from the Murray Corporation of America at Detroit, one of the larger manufacturers of automobile bodies.

As the bodies arrive at the Crosley plant in the boxcars in which they are shipped, each body is placed on a steel "dolly" upon which it is



Assembling the motor to the chassis. The cable is fed through the frame and the motor is pulled up in position. The hoist is carried on an overhead main rail, making it possible to move the motor along with the moving conveyor while anchoring it in position on the chassis.

pairs, upon which the body rests for transportation. Each support is carried on the tracks, ensuring balance and taking the weight off from the conveyor chain. The conveyor is geared up to deliver 25 cars per hour at the end of the line, equivalent to 20 cars in eight hours.

Parts that are used in the construction of the car are stored along the line of the conveyor at the point where they will be assembled to the chassis space being left between the banks of materials and the conveyor track for the workmen. From the time the body is lifted onto the conveyor at the receiving end of the

wheeled into the plant and to the receiving end of the assembly line conveyor. This conveyor, built by the Link-Belt Company, consists primarily of a double track supported at working height from the floor with an endless Link-Belt chain traveling in the center between the tracks.

At regular intervals the chain carries especially-designed supports, in

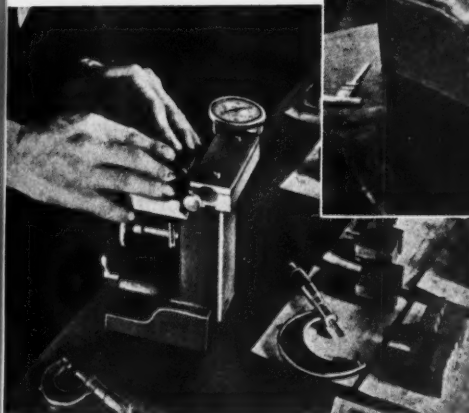
conveyor until the car is driven off the line at the "finish" end, workmen are constantly busy assembling the parts and anchoring them in position. The first parts to be added are the springs, followed by the steering assembly, electrical wiring, batteries, fenders, and so on with parts that can be assembled from the sides above the body.

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Spray-painting the wheels. Using modern spray-painting equipment and a specially-constructed spray booth with a water curtain at the rear to catch all excess spray, each wheel is given a final coat of color before being assembled to the car.

The bodies are transferred from the first half of the line to the second by means of a hoist suspended from an overhead monorail, special clamps being used which grip the body at front and rear. Immediately after the body starts upon the second lap of its journey the engine is set in and anchored in place, followed by the axles, wheels, muffler, and the remaining parts.


As the car nears the end of the line, a driver enters to control the car as it is released by the conveyor and starts down the incline toward the test floor. Upon reaching the

At about the middle of the assembly line, the first half of the line terminates and a new one begins. The second half of the conveyor carries the bodies on a structure that is approximately head-high, making it possible for the workmen to work under the car without the necessity of pits and without having to work in cramped or uncomfortable positions.

Assembling the tire to the wheel. The wheel is placed on a horizontal chuck-plate, where it is automatically clamped. The operator then drops a tire over the wheel, forces one edge of the tire over the rim, and steps on a switch-pedal by means of which power is applied to the chuck. As the chuck slowly revolves, the operator bears down on the tire with a roller which forces the tire into position completely around the wheel. The entire operation takes less than a minute.



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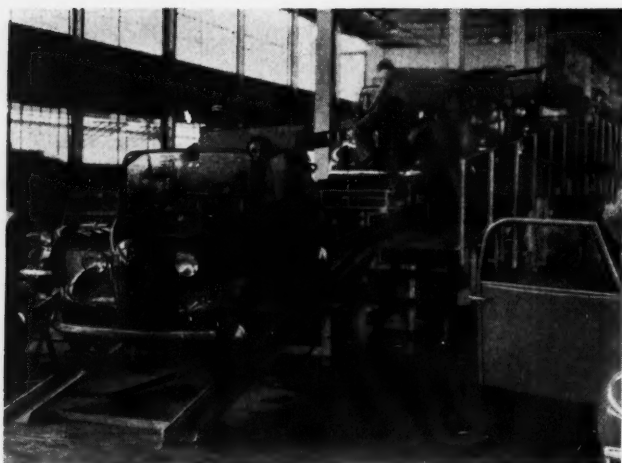
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Driving a complete car off the end of the line. The hood cover, which is in its original package in the rear seat, is put on after all tests have been made and the car has been declared ready for shipment.

is driven onto a Weaver Brake Testing Machine where the efficiency of each brake is individually recorded. As the

level, it is stopped long enough to receive a supply of gasoline and then is driven onto the "road test" stand. Here the car is held stationary by depressions in the floor into which the front wheels drop while the rear wheels rest on large ball-bearing steel rollers set into the floor. These rollers make it possible to "drive" the car at any speed and as long as required to put it through its paces in order to make sure that it is mechanically perfect and so that all necessary adjustments can be made before the car is released for shipment.

Upon leaving the road test, the car

car is driven onto the machine and stopped, each wheel comes to rest on a tread plate that is set into the floor. The tread plates are actually four horizontal spring scales that weigh the drag on each wheel as the brakes are applied, designed so that as the car stops, each tread plate pulls against a spring and actuates a simple lever that causes a red liquid to rise in the corresponding tube in the recording head.

The four tubes have the same relative position as the four wheels of the car, and the mechanism is called



Giving a car the road-test. With the rear wheels resting on ball-bearing rollers, the car can be run as long as necessary, at any speed desired, in order to discover any possible defects and remedy them.

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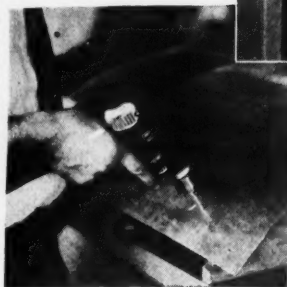
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There's a difference in portable electric tools — a difference that is readily apparent when you compare CP Universals with others. . . . CP Universals are built for continuous, production service. They have high torque, high powered, cool-running motors . . . ball bearings mounted in steel inserts . . . through bolts (instead of tapped holes) . . . helical armature gearing and other

CP features of design and construction which insure greater production and lower maintenance under the most severe operating conditions. . . . CP Universal Electric Tools are ideal for aeroplane and automotive plants, body builders, sheet metal workers and other production industries. Send for a copy of Catalog No. 899.

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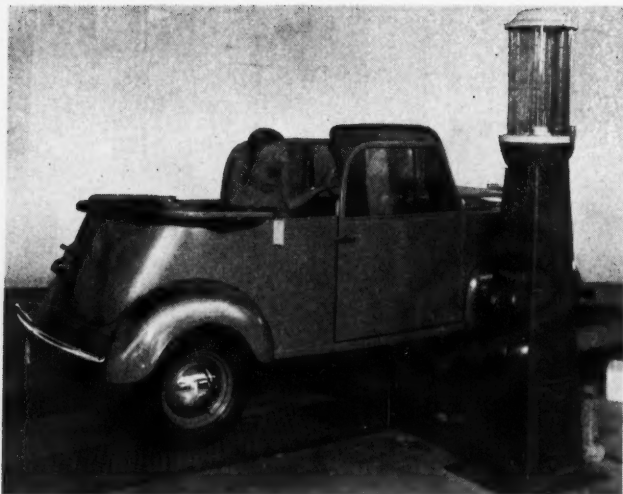
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## UNIVERSAL TOOLS ELECTRIC

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As the car is driven onto this Weaver Brake Testing Machine the brakes are applied and the car is brought to a stop. Four columns in the glass dome on the machine tell instantly whether or not the brake-pressure is even and which brakes need adjusting.

brated in hundreds of pounds with percentage calibrations indicating allowable variations in equalization. Thus an analysis of the braking

adjustment is adequate for safety. With the brakes properly adjusted, the car is driven to the shipping department.

**Landis 6-In. Type C Plain Hydraulic Grinder.** The Landis Tool Company, Waynesboro, Pa., has made available to the trade a 16-page illustrated bulletin describing the Landis 6-In. Type C Plain Hydraulic Grinder. The grinder is recommended by the manufacturer as an ideal machine for the mass production of small parts within its range and capacity. Typical operations which can be performed are the grinding of universal joint spiders, bearings, small motor armatures, small shafts, and roller bearing rings. Copy free upon request.

**Power Presses.** The line of presses made by Zeh & Hahnmann Co., 124 Vanderpool St., Newark, N. J., is described and illustrated in a loose-leaf folder now being distributed by this firm. The line includes patent percussion power presses, reclining power presses, open back gap frame power presses, horn presses, universal bench power presses, power punching presses, straight side single crank presses, and double crank power presses. Specifications are listed for each type of machine described. Copy free.



# ABRASIVE

## Surface Grinders

QUALITY • ACCURACY • DURABILITY • ECONOMY

WRITE FOR PARTICULARS

**ABRASIVE MACHINE TOOL CO.**

EAST PROVIDENCE, R. I.



# GEOMETRIC STYLE DS DIE HEADS

Designed especially for Brown & Sharpe Automatics, but suitable for hand machines as well, the Geometric Style DS Die Head is a precision tool for accurate and economical screw threading. The buffer action shank allows the tool to yield as it starts on the thread, insuring a smooth, uniform engagement of the chasers without shaving. The adjustable trip mechanism is unusually sensitive, eliminating the possibility of stripping threads. It may be set to cut an accurate length of thread, so that close camming is unnecessary. On B. & S. Automatics the head may be closed automatically by a stop on the bed of the machine, contacting the closing attachment.

Like other Geometrics, this tool is hardened and ground throughout, built to close limits, carefully tested and inspected. The Style DS Die Head will cut smooth, accurate screw threads on your work — and save you money. May we send you our booklet?




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## THE GEOMETRIC TOOL CO.

NEW HAVEN, CONN.

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New factory and air-conditioned office building of The Monarch Machine Tool Company, Sidney, Ohio.

## Monarch Machine Tool Completes New Plant

**C**CLIMAXING five years of continual expansion during which its employment more than doubled, The Monarch Machine Tool Company, Sidney, Ohio, celebrated completion of its new factory and office building with a two-day open house on Saturday and Sunday, June 24th and 25th. The event was attended by nearly 10,000 people—equal to the entire population of the city.

Started in 1909 with a brick shed for a factory building, the company

employed a force of 25 men during its first year. Today the factory organization includes approximately 600 people. Its newest building increases the plant area 35 per cent to 135,000 square feet, which is almost twice its 1929 size.

In addition to doubling the final assembly department and quadrupling the design and engineering departments, the new building will provide new offices for all management personnel, an auditorium seating 500, a

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cafeteria and employees' lounge room, new quarters for foreman and apprentice training, a photographic laboratory, a blueprint room, and a large display and demonstration room. All except the assembly department are air-conditioned.

The design and engineering department occupies four times the space it had in the previous building and is equipped with acoustically treated ceilings and 1,400-watt lighting fixtures which provide 60 lumens of light at working level. The entrance lobby is of Tennessee floral marble. Opposite the entrance and directly above a drinking fountain, illuminated by indirect light, is the inscription, "Machine tools are the foundation of modern civilization. They serve to enrich human life."

An interesting feature of the plant is the equipment for applying the final finish to the product. After the preliminary operations of filling, glazing, and sanding have been completed, the final color coat is applied by spray painting. This operation is performed on the assembly floor, making use of modern facilities which eliminate the need for an enclosed booth, which keep the air free from spray, and removes fire hazard.

Painting is done over a 7 x 12-ft.

grating in the floor through which air is exhausted at a rate of 200 ft. per minute. The fume-laden air is discharged into a large welded tank where a continuous cascade of chemically-treated water effectively segregates the solids in the fumes and



A placard with the name of the operator on each machine in the plant was a feature of the Monarch Machine Tool Company's open house, which was held at the opening of the new plant and office building. Here is Paul Smith, planer operator, explaining to his wife and children how he machines lathe beds.

precipitates them in the form of a rubber-like substance which can easily be cleaned from the pit. The air is then carried off through an exhaust stack. The draft is strong enough to pull into the exhaust any spray not immediately deposited on the work.



The finishing coat is sprayed onto each new machine in the assembly line within a few feet of other operations and without the need for special walls or partitions. The excess spray is drawn through a grill in the floor by air-suction.

In an interview with Wendell E. Whipp, President of The Monarch Machine Tool Company and also President of the National Machine Tool Builders' Association, Mr. Whipp said, "Today's new building and increased employment represent the fruits of a program of research and development during the darkest days of the depression. When machine tool orders were at their lowest level in a quarter of a century, we concentrated upon improving the design of our lathes, broadening their scope of usefulness in industry and developing more efficient methods of building them, knowing that as business emerged from the depression the need for improved machine tools and the savings in production costs made available through such tools would

be greater than ever."

A feature of the open house was an exhibit demonstrating how machine tools make possible the high standards of modern civilization. So many comments have been received on the excellence and value of this exhibit that it may be maintained permanently.

**Microscope Aligning Instrument.** This instrument, a product of Cincinnati Grinders Incorporated, Oakley, Cincinnati, Ohio, is illustrated and described in a bulletin that has been issued by this firm. The Microscope Aligning Instrument is designed specifically for aligning long Cincinnati grinding machine beds. Complete details concerning the various parts which comprise the assembled instrument and its function are given in the bulletin. Copy free upon request.

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# Excellent Program Planned for Machine Tool Congress

THE program for  
the Machine Tool

Congress which, as in former years, will be held at Cleveland in October in connection with the Machine Tool Show, has been planned with ten organizations participating. Included are the National Electrical Manufacturers' Association, the American Society of Mechanical Engineers, the American Society of Civil Engineers, the National Foremen's Association, the American Foundrymen's Association, the Associated Machine Tool Dealers of America, the Cleveland Engineering Society, the Society of Automotive Engineers, the American Society of Tool Engineers, and the National Machine Tool Builders' Association.

The purpose of the Machine Tool Congress is to provide a series of interesting and educational discussions on subjects related to and connected with the broad field of American industry, and particularly as it applies to metal manufacturing, for the benefit of visiting members of the association and for other interested visitors to the Machine Tool Show.

According to A. C. Danekind of the General Electric Company, who is president of the Machine Tool Congress, the nature and scope of the discussions will in themselves be sufficient to make the trip to Cleveland worth while for progressive engineers and executives.

In a discussion regarding the Show,

Mr. Danekind said: "This year the speeches are not going to be confined to technical subjects. Plans call for the securing of nationally-known speakers who are qualified to discuss the broader aspects of business, particularly with respect to the bearing of machinery and equipment upon our national economy. At the same time, however, the program will include technical papers upon specific subjects of special interest to men connected with or interested in various phases of the machinery and metal-working industry, presented by men who are considered authorities upon their respective subjects."

The schedule of organization meetings is as follows:

Wednesday, October 4:

National Electrical Manufacturers' Association, Hotel Cleveland Ball Room, 8:00 P. M.

Thursday, October 5:

American Society of Mechanical Engineers, Machine Shop Practice Division, Hotel Cleveland Ball Room, 8:00 P. M.

American Society of Tool Engi-

neers, Cleveland Engineering Society quarters at Guildhall, 8:00 P. M.

General Electric Institute open house and lighting demonstration, Nela Park, 7:30 to 10:00 P. M.

Friday, October 6:

American Society of Tool Engineers dinner meeting, Hotel Statler Ball Room, 6:30 P. M.

National Association of Foremen, Music Hall, Cleveland Public Auditorium, 8:00 P. M.

Monday, October 9:

American Foundrymen's Association dinner meeting, Hotel Hollenden Ball Room, 6:30 P. M. Sym-

posium on castings, same place, 8:00 P. M.

Associated Machine Tool Dealers of America dinner meeting, Hotel Cleveland Ball Room, 6:30 P. M.

Tuesday, October 10:

Cleveland Engineering Society, Machine Design Division, Music Hall, Cleveland Public Auditorium, 8:00 P. M.

Wednesday, October 11:

Society of Automotive Engineers dinner meeting, Hotel Cleveland Ball Room, 6:30 P. M.

Thursday, October 12:

General Electric Institute dinner meeting and lighting demonstration, Nela Park, 6:30 P. M.

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**Heat Treated Alloy Steel Sling Chain.** An illustrated bulletin explaining the advantages of the new nickel-molybdenum alloy used in Taylor Alloy Steel Sling Chains is now being distributed by Joseph T. Ryerson & Son., Inc., 16th and Rockwell Sts., Chicago, Ill. In addition to a table of safe working loads and a specifications chart, complete data is given on all chains carried in stock by Ryerson for immediate shipment. Copy free to engineers, plant executives, and other users of steel chain.

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**Repair Clamps and Saddles for Steel and Cast Iron Pipe.** The distinctive feature of a 32-page catalog now being issued by M. B. Skinner Co., South Bend, Ind., is a "leak-loss" chart which embodies graphic information valuable to anyone operating pipe lines. The chart shows how much steam, water, oil or air escapes from various size leaks in pipe, under various pressures. Figures show what these leaks cost at various unit prices and thus one can visualize the tremendous losses which can occur from what are often thought to be harmless leaks.

Nine different styles of pipe repair clamps for stopping leaks without replacing pipes are shown in the catalog under the trade-mark "Skinner-Seal." Booklet free upon request.

**Continental Band Filer.** Continental Machine Specialties, Inc., 1306 S. Washington Ave., Minneapolis, Minn., has published a four-page folder describing the Continental Band Filer—a machine which is said to do internal and external filing in half the usual time. File bands  $\frac{1}{4}$  and  $\frac{3}{8}$  in. wide can be used on materials ranging from high carbon steel to soft brass, wood, and so on. Copy free.

**Threadwell Taps, Dies, Screw Plates and Small Tools.** Catalog No. 10, now being distributed by Threadwell Tap and Die Company, Greenfield, Mass., contains standard lists of the hand and machine taps, dies, die holders and screw plates, tap and reamer wrenches, keyway cutters, broaching presses, counterbores, and other tools made by this firm. Sizes, dimensions, and prices are given in each case.

The last 40 pages of the book are devoted to tables and formulae useful in determining the limits and tolerances for taps, tables of American National thread forms, basic thread dimensions and tap drill sizes, basic thread dimensions for American National Acme screw threads, constants for finding pitch and root diameters, weights of round bars in pounds per linear inch, and so on.

Copy of this book free to any engineer or factory executive.

# Alike IN PERFORMANCE BUT SO DIFFERENT IN COST!

As Made of SAE 3135  
— Cost per Gear, \$1.16

As Made of STRESSPROOF  
No. 2 Bar Steel—  
Cost per Gear, \$0.59

## All Because of STRESSPROOF BAR STEEL

T. M. Reg. U. S. Pat. Off.

Savings like these are sensational—but not unusual. Manufacturers making a wide variety of parts like shafts, gears, worms, bolts, pins, lead screws and related items today enjoy similar economies. The case of the drive gear shown is typical. By replacing hot rolled SAE 3135 with STRESSPROOF No. 2 Cold Finished Steel Bars, the maker cut production costs in several ways: (1) By increasing cutting speeds from 70 to 110 s.f.p.m., shaping speeds from 33 to 55; (2) By increasing tool life from 20,000 to 60,000 pieces on one operation, and from 5,000 to 15,000 pieces on another; (3) By reducing the total number of operations from 15 to 7 through elimination of heat treating and 7 other steps. And although the cost per gear was almost halved, performance, as proved by tests, matched that of previous gears.

The odds are all in your favor that you, too, can enjoy similar savings. Write now for our free Engineering Bulletin which tells how STRESSPROOF provides in *one steel* the unusual combination of high strength, superior machinability, unique wearability, and non-warping qualities—*right in the bar* as received.

Write for **FREE**  
**Engineering Bulletin**  
Tells Properties of  
STRESSPROOF Cold  
Finished Bars; Gives  
Case Studies of Actual  
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# LaSalle STEEL COMPANY

Manufacturers of the Most Complete Line of Cold Finished Steel Bars in America

LA SALLE STEEL COMPANY, P. O. Box 6800-A  
Dept. 8M, Chicago, Illinois

Please send your STRESSPROOF Engineering Bulletin Giving Comparative Cost Data.

Name.....Position.....

Company.....Address.....

City.....State.....

# 21st National Metal Congress and Exposition

*Opens in Chicago on October 23rd.*

**C**HICAGO has been selected as the scene of the 21st National Metal Congress and Exposition, to be held there this year under the joint sponsorship of the Wire Association, the American Welding Society, the Institute of Metals Division and the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers, and—of course—the American Society for Metals. The five-day annual Congress will open on October 23rd. Portions of the program yet to be announced will be devoted to discussions by qualified leaders in the several societies participating.

If one can judge from the number of space reservations that have been received from firms who plan

to present displays at the Exposition, metal and metal products manufacturers are optimistic about prospects for business during the coming year. William H. Eisenman, Secretary of the American Society for Metals and managing director of the Congress, reports that space in the 1939 Exposition is 95 per cent reserved and there are still more than two months before the Congress and Exposition open. This figure represents a 15 per cent increase over the space contracted last year.

Registration will be the only requirement for admission to the National Metal Congress for any engineer, plant executive, or technician engaged in any phase of metal manufacturing.

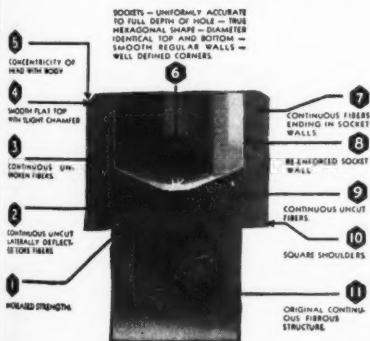
**"When, Why and How to Grind Threads."** An explanation of the reasons why threads on some products should be finished by grinding is contained in a 16-page booklet published by Detroit Tap & Tool Company, 8432 Butler St., Detroit, Mich., who are now offering thread grinding service to the industry. The booklet cites several typical examples in which the grinding of threads aided in the production of a better product. Copy free to manufacturing executives upon request.

**Boice-Crane Catalog.** Boice-Crane Company, 1730 Norwood Ave., Toledo, Ohio, is announcing a 1939 catalog listing their complete line of 21 models in 11 types including circular saws, band saws, jigsaws, shapers, grinders, sanders, jointers, drill presses, planers, tapping machines and metal spinning equipment. Adding new models to their line for 1939 has required enlarging their catalog to 44 pages of interesting material for woodworkers, metal working shops, industrial firms and schools. Copy free.

THE RESULTS OF A NEW  
MANUFACTURING METHOD  
PATENTED BY HOLO-KROME



## the Real Test of Quality



Holo-Krome FIBRO FORGED Socket Screws constantly prove their Quality, inside and out, in the most exacting tests repeatedly being made by Socket Screw Users.

Each Test emphasizes this well known fact—that Holo-Krome Quality *does* give Unfailing Performance.

You may have a particular kind of a Test you would like to make—why not do it! You too, we guarantee, will find the same result—Unfailing Performance. Make use of our Test Offer, today.

**TEST OFFER—Give style, size, thread, etc. SCREWS FREE**

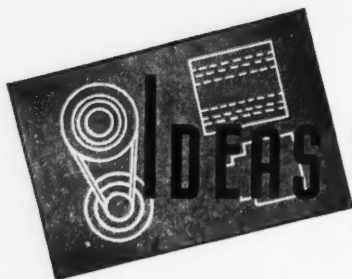
# HOLO-



# KROME

THE HOLO-KROME SCREW CORP.  
British Representatives:  
Geo. H. Alexander Machinery, Ltd.

HARTFORD, CONN., U. S. A.  
82-84 Colehill St.,  
Birmingham



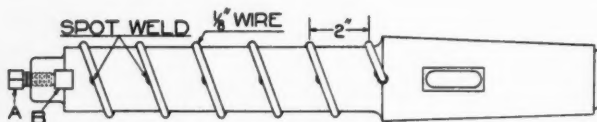
## IDEAS FROM READERS

### Welding Aids Chip Removal

By A. W. PAYNE

THE boring bar illustrated in the drawing is of unusual interest, due to the method that has been developed and applied here to keep chips from collecting around the cutting tool when boring deep holes with little bar clearance.

The feature referred to consists of a piece of  $\frac{1}{8}$ -in. wire which has been



Wire, helically wound and welded in place, feeds chips away from point of tool.

wound around the bar as shown and welded in place by spotwelding at intervals. A square hole for the tool-bit is provided in the usual place near the front end of the bar at the point B, and a setscrew A is provided to hold the tool in position.

When the tool is cutting, the screw action of the revolving spiral feeds the chips back toward the hole opening and thus prevents them from accumulating around the front end of the bar. The wire used on the bar shown here was  $\frac{1}{8}$ -in. diameter, but the diameter should, of course, depend upon the diameter of the bar

to which it is applied. Wire of  $\frac{1}{16}$ -in. diameter per inch diameter of the bar is usually satisfactory.

### Planer Tool Attachment for Undercutting

By J. R. WHITTLES

THE drawing illustrates the design of an attachment for use in under-

cutting work on the planer. The advantage of the attachment consists in that it allows the cutting tool to swing clear on the return stroke—which is necessary if trouble is to be avoided.

The attachment is connected to the regular clapper box and crossrail and makes use of the regular clapper box parts such as the saddle W, swivel U, slide G, clapper box J, and the clapper block Q.

The clapper block is bolted firmly to the seat of the clapper box J by means of the screw K (sec. X—X) and the screws L, which hold the toolpost A, are those which are regularly used to hold the planer tool. Toolpost A is bored for the bearings D1 which, in turn, are bored to fit the shaft D. Shaft D carries the actual toolholder, and is designed to swivel in the bearings D1 so that



# CUT HOLES

**EASIER . . FASTER . . CHEAPER!**

MARVEL Hole Saws out-cut and out-live any other ordinary hole saw in portable drills. They also have the extreme strength for drill press and lathe use, and the set for deep drilling up to 1 1/8" in steel.

They possess the exclusive MARVEL feature of a composite non-breakable saw: a genuine 18% Tungsten High Speed Steel cutting edge, welded by a special process to a chrome vanadium body. With this construction you get the fastest cutting, longest lasting cutting edge available — PLUS a hole saw that can easily withstand the terrific peripheral speeds of small drill presses and portable drills. Proportionately heavier arbors (with high speed pilots) have solid hexagonal shanks that fit both 2 or 3 jaw chucks. Sizes from 3/4" to 4 1/2" diameter.

*Write for name of local distributor.*

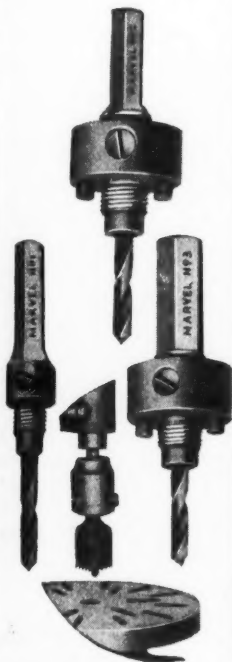
## MARVEL High - Speed - Edge HOLE SAWS

**For portable drills,  
drill press and lathes**

**ARMSTRONG-BLUM MFG. CO.** 5745 Bloomingdale Ave.,  
CHICAGO, U. S. A.

*"The Hack Saw People"*

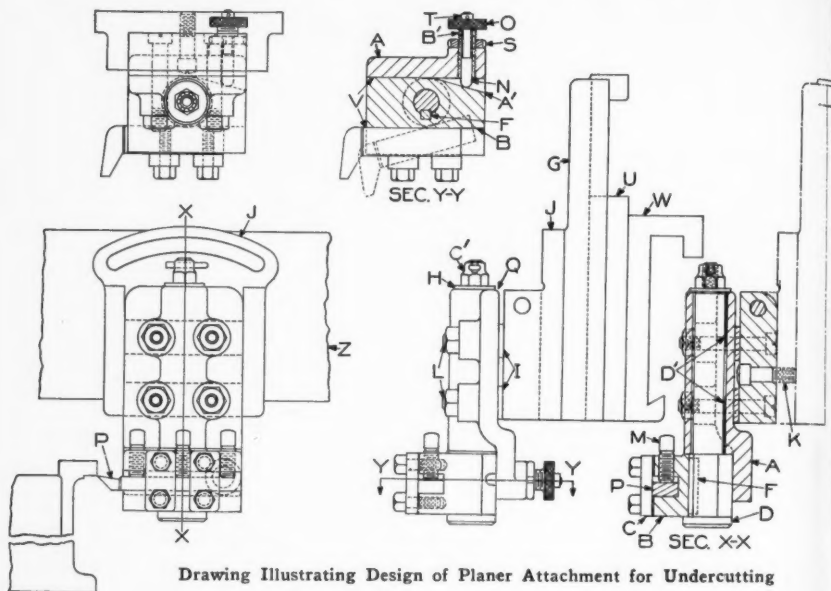
Eastern Warehouse and Sales: 199 Lafayette St., New York



the tool **P**, which is held in the toolholder **B**, can swing clear on the return stroke of the planer.

Toolholder **B**, which is of steel, is

knurled head of the screw **O**. A locknut **S** holds the screw in place. The two steel bars **I** separate the toolholder from the clapper block.



Drawing Illustrating Design of Planer Attachment for Undercutting

bored to a force-fit on shaft **D** and is keyed to the shaft so that it will swing as the shaft turns. The planer tool is held by the clamp **C** and is anchored in position by the use of the setscrew **M**. The toolpost **A** is offset at the bottom end and is machined so that the front end of the toolholder **B** will take the thrust of the cut (see **V** in sec. **Y—Y**). The bevel **A1** (sec. **Y—Y**) on the rear of the toolholder **B** allows the toolholder to swing back far enough, on the return stroke of the table, to let the tool clear the work. At the end of the return stroke the toolholder swings back into cutting position, under pressure from the pin **N** and its actuating spring. The tension of the spring is regulated by the

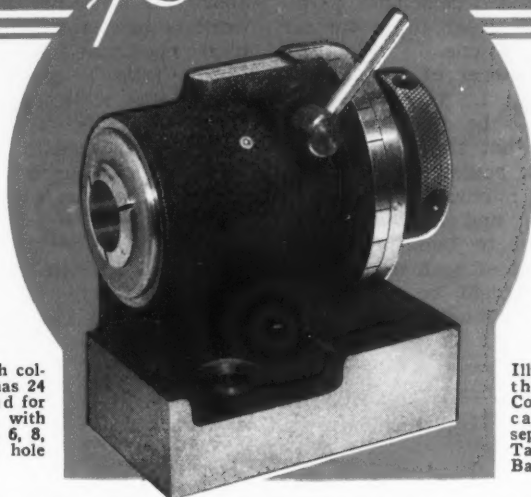
Where work that must be planed on under surfaces comes to the planer frequently, the tool described above will pay for itself within a short time in time and tools saved and in a better finish.

## Double-Surface Continuous Grinding Machine

By JOSEPH WAITKUS

**I**N PLANNING an operation layout for production, a manufacturer was confronted with the problem of finishing two surfaces on opposite sides of a gray iron casting. The castings were fairly true as delivered from the foundry, but a light

# Hardinge COLLET INDEX FIXTURE



1" capacity through collet. Index Plate has 24 holes. Furnished for other collets and with either a 2, 3, 4, 5, 6, 8, 10, 12, 15 or 30 hole Index Plate.

Illustration is one-third actual size. Collet Index Fixture can be purchased separately or with a Tailstock and Sub-Base.

## ACCURACY - LOW COST - TIME SAVING - CAPACITY - ADAPTABILITY

Practical time saving applications make the use of the Hardinge Collet Index Fixture essential in the modern tool room and production departments. Besides being an economical means for holding work, it offers the feature of rapid and accurate indexing. Miller and grinder applications are shown. The Hardinge Collet Index Fixture can also be used with a shaper or a drill press—you will find many more uses in your particular line of work. *It is no longer necessary for your operators to make expensive holding devices for different applications.*

The Hardinge Collet Index Fixture can be held in a vise, on a magnetic chuck or bolted to the table of any machine. It is used for milling keyways, punches, pinions, flutes in end mills, taps, counterbores and cutting gear and sprocket teeth. Squares on tap shanks, tangs, flats on locaters, multiple slots and notches of all kinds are easily milled. Larger work can be held on an arbor in one of the collets for milling and drilling.

Punches can be ground round, square, hexagon,

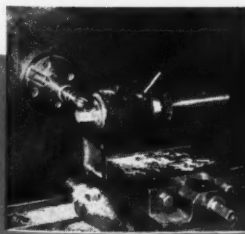
or to other usual shapes. Special size square, hexagon, octagon or other shape test plugs can be machined and ground to size.

The Hardinge Collet Index Fixture is very handy for making one or two lipped cutters for high speed milling heads, grinding to shape from hardened high speed steel. It is ideal for sharpening woodruff and other shank cutters—also, for sharpening the end of teeth on reamers, end mills, hollow mills, counterbores and for grinding broaches, etc.

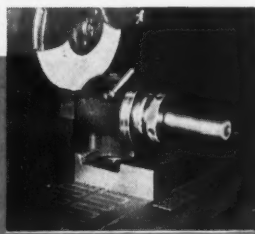
PRICE: \$45.00 . . . . . ASK FOR BULLETIN CM GIVING COMPLETE DETAILS

**HARDINGE BROTHERS, Inc.,**

**ELMIRA, N. Y.**



Miller Application



Grinder Application



With Tailstock and Sub-Base

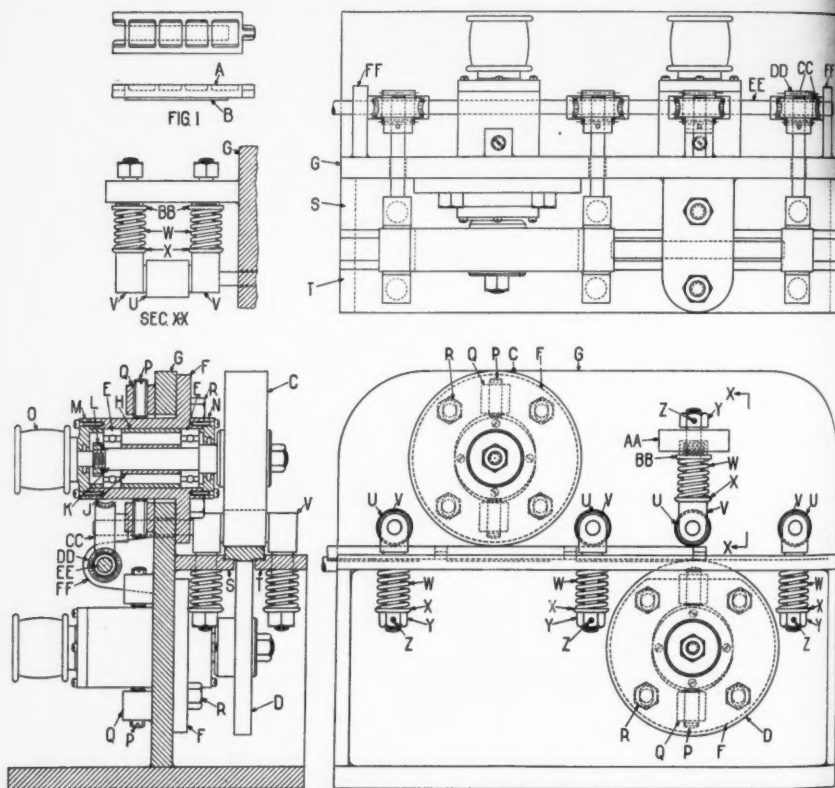
machining operation was necessary to remove irregularities and imperfections and to provide smooth, parallel surfaces in order to locate for subsequent operations.

The general form of the casting is shown in Fig. 1. The surfaces A and B were to be finished and it will be noted that the surface A is wider than the surface B. In order to obtain the maximum production, reduce handling, and ensure accuracy, it was decided to build a double-spindle machine of such design that both surfaces could be finished at one pass. The design shown here-

with was adopted.

The wheel-spindles are located one above the other, as shown, and the work is passed between them on a track machined in the two sections of the table S and T. To aid in feeding the work past the grinding wheels and also to keep the surfaces in contact with the wheels, the four rollers U, supported in the bearings V, are provided.

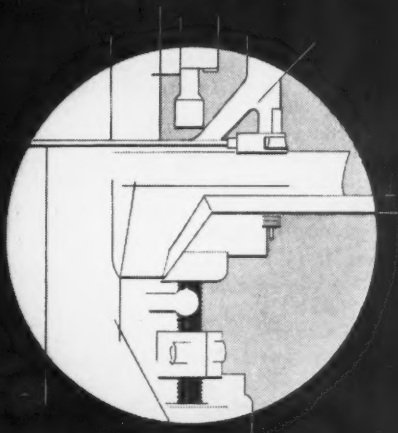
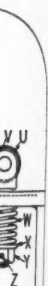
Each of three of the bearings has a shaft which extends downward through a hole in the table and is long enough to take the tension spring W and the nut Y with its



Drawing Illustrating Design of Machine for Grinding Opposite Surfaces of Casting

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## TO REDESIGN OR NOT? THAT WAS THE QUESTION

Finding just the right material for a single trouble-making part sometimes saves redesigning an entire machine; and that means a saving all around.

For example: breakage of the lower die carrier of a 15-ton medicinal pellet press made it look for a while as though some drastic changes in design would be required — with consequent increased manufacturing costs, to say nothing of loss of interchangeability.

Then the manufacturer adopted Chrome-Molybdenum (SAE 4140) Steel,

which combines high tensile and shock-fatigue strength. That was two years ago. There has not been a single failure since. Redesigning has been obviated, interchangeability preserved, customers pleased.

Similarly, Molybdenum Steel may prove the answer to your special service problems. Our technical book, "Molybdenum in Steel", giving practical data, will be sent free on request to production executives and engineers interested in taking advantage of modern steels.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

**Climax Molybdenum Company**  
**500 Fifth Avenue, New York City**

# MOLY

washer and cotter pin. The fourth roller, located over the grinding wheel **D**, is supported by the piece **AA** bolted to the frame-plate **G**, and tension is provided by the nut **BB**. The nut **Y** is used to adjust the roller **U** relative to the surface of the work-piece.

Each roller shaft extends through the plate **G** and carries, at the end, a wormwheel **CC** that meshes with the worm **DD**. The shaft **EE** is driven slowly by a small gear-motor.

Wheel **C** is wide enough to cover the entire upper surface of the casting and wheel **D**, which finishes the opposite surface, is accordingly narrow. Both wheels are supported in the same type of bearing arrangement, consisting of two ball bearings **E**, located in the housing **F**, which in turn is bolted to the frame **G**. The bearings are held in position on the shaft **K** by the locknut **L**, and suitable spacing collars, **H** and **J**, are provided between the bearings. The entire assembly is sealed by the covers **M** and **N**, which accommodate felt rings. The pulley is indicated at **O**. The design is very rigid, suitable for high speed operation, and is sealed from dust and dirt.

To provide for adjustment of the grinding wheels, the setscrews **P** are threaded into the blocks **Q**, which in turn are anchored to the frame-plate **G**. Slotted holes are machined into the flanges of the housings **F** for the

bolts **R**. By turning the setscrews **P**, the grinding wheel spindles can be adjusted vertically as required. When properly adjusted, the bolts **R** are tightened to anchor the flanged housing to the frame-plate **G**.

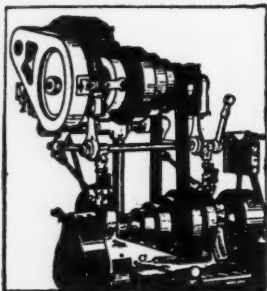
The castings are fed by hand to the first roller, after which they move forward under pressure of the rollers, pushing the previous castings ahead of them. The rollers can be adjusted to vary the tension of the different rollers and maintain the correct amount of pressure. The rollers work best enclosed in composition rubber sleeves.

## New Books

**Grinding Wheels and Their Uses.** By Johnson Heywood. Published by the Penton Publishing Co., Cleveland, Ohio. 367 pages, 351 illustrations, 26 tables. Board covers. Price, \$3.00.

This book will be found enlightening to those seeking the latest information on modern grinding practice. Shop executives can turn to it for help on everyday grinding problems; grinding machine operators can derive much benefit from the information presented; students in technical schools and colleges can profit from the operating experience of engineers, designers, foremen, and employees engaged in the grinding industry.

In these 23 chapters the author has presented a large amount of information to which many hundred men have contributed their practical and theoretical knowledge as well as descriptions



## Cuts MOTORIZING Costs

Motorize without buying motors. Remco's patented adjustable motor base makes this possible. The adjustable rails take any motor of reasonable size—new, or used. Motors changed instantly in case of "burn-out." New folder FREE! Write—Remco Products Corp., State & Hay Sts., York, Pa.

## REMCO MOTOR DRIVES

for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.



# Are Looking for Best Cost Per Piece Polished

## *You'll Like Alundum Abrasive*

**I**N plants where accurate records are kept and polishing is carefully figured on the basis of "cost per piece polished" you'll find that Alundum Abrasive is an outstanding favorite. The cost department figures conclusively prove its merits.

Of course there are definite reasons for the success of Alundum Abrasive—special tests at the electric furnace plant assure its hardness and toughness; special crushing and screening processes assure its accurate shaping and sizing; special surface treatments give it extra capillarity—extra "sticking" power.

If you are not already using Alundum Abrasive it will pay you to try it on your jobs.

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## **NORTON ABRASIVES**

of various grinding practices and methods they have found highly satisfactory. The author says: "The material in the book came from three general types of source: engineers on the staffs of grinding wheel and grinding machine manufacturers; method engineers and designers in shops which perform grinding operations on their products, and foremen and employees of grinding departments."

Internal, cylindrical, surface, roll and cam, eccentric and other out-of-round surface grinding are treated in separate chapters. The author discusses the materials used for polishing and buffing and explains how to set up polishing wheels. Throughout the book he stresses ways in which grinding output can be stepped up and the required finish imparted at the lowest overall cost. Figures are cited to prove how much the use of better methods has increased production and reduced costs.

Wheel recommendations for the various types of grinding are presented in tabular form and include the kind of abrasive, grain, grade and bond for the particular material and job. The text is supplemented with data on the care and safe use of grinding wheels, wheel breakage and safety, and a glossary of trade names.

**Design of Industrial Exhaust Systems.** By John L. Alden. Published by The Industrial Press, 148 Lafayette St., New York, N. Y. 220 pages, 110 illustrations. Bound in cloth. Price, \$3.00.

The subject of exhaust ventilation embodies the theory of air flow, the application of this theory to practical design, the selection of commercial fans and dust collectors, the construction of the physical plant, and testing of the completed system. Little space has been devoted to exhaust fans inasmuch as the essential facts necessary for their application are available from the manufacturer. The author has confined his discussion to those things which the engineer must know before he can ask for quotations.

The book makes no attempt to cover the broad fields of health hazards, industrial dusts, or the pathological phases of industrial hygiene. The purpose of this book is to tell the engineer how to design and build or buy an exhaust system that will adequately and economically perform the functions prescribed by the industrial hygiene ex-

pert or by law. The author aims to dispel most of the mystery surrounding exhaust work and to express many of the trade secrets in straight-forward engineering terms. The data presented should permit the design of adequate and low-cost systems and assist in appraising competitive designs.

**Natural Laws Applied to Production.** Published by Mathews Conveyor Company, 140 Tenth St., Ellwood City, Pa. 32 pages, 8½ x 11 in. in size. In the third edition of this book, now just off the press, a number of changes have been made in the text in order to make it more easily understood by the layman. The fact that this book has gone into three editions would indicate that the material contained has been found attractive and interesting by industrial executives.

The text is substantially the same as in the earlier editions, being presented in eight chapters under the following headings: 1—Facts vs. Principle. 2—The Law of Least Action. 3—Functional Sequence. 4—The Laws of Production. 5—The Laws of Materials Handling. 6—The Function of Management. 7—"From Here On." 8—Basic Elements of a Conveyor System.

Beginning in the first chapter with a discussion of the principles of production in agriculture and industry, the author discusses the natural laws which govern every phenomena of the external world and the principles upon which the foundation for the science of mathematics are laid. The application of these principles in production comprised a subject which is not only interesting, but which offers valuable ideas to the production executive.

In addition to a presentation of the principles of materials handling upon which modern industrial efficiency is founded, the text includes diagrams to illustrate the flow of production through the various types of conveyors and their relation to movement, together with several pages of illustrations showing different kinds and types of conveyors used for handling a wide variety of materials through the sequences of manufacturing operations.

The book should be invaluable to the manufacturing executive in any plant where the product is manufactured on a production basis. Copy will be mailed free to any mechanical executive who will address his request on his company letterhead.

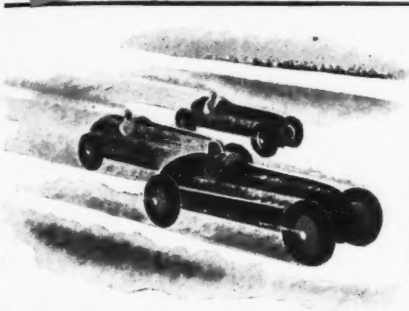
What a test for EVERLOCKS!  
They held my car together  
perfectly.

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I used EVERLOCK washers  
exclusively. I depended on  
them to keep intact every nut  
and screw in my car. They did.

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CHAMPIONS USE EVERLOCK WASHERS



## Over the Editor's Desk

### The Machine Tool Show

**A**GAIN the manufacturers of machine tools and accessories are preparing to present, in a co-ordinated exhibition, the results of their efforts in recent years in the direction of increased efficiency in metal manufacturing equipment. Again will be assembled, under one roof, the fruits of thousands of hours of mathematical calculations, of bending over drawing tables, of making patterns and dies, of pouring experimental castings and pounding out forgings, of machining in the laboratory and experimental department, and then of discarding and repeating the whole cycle over and over again—to the end that the art of working metals may be advanced through closer fits, finer finishes, and lowered production costs.

Again the National Machine Tool Builders' Association is preparing to sponsor a Machine Tool Show, to be held—as in former years—at the Cleveland Public Auditorium in Cleveland, Ohio. The time will be October 4 to 14.

It is expected that every engineer and manufacturing executive who can make the trip will be present, including many from foreign countries, to take advantage of this opportunity to see, at one time and in one place, the best that America has to offer in metal-working tools. These men will be looking for new machines that can be used to advantage in their own plants in turning out bet-

ter products or in reducing costs.

The Machine Tool Show is intended only for persons directly connected with metal production. The general public is not expected to be interested, but this very fact suggests the question "What do these machines have to do with the average person?" "What bearing do these machines have on the lives of a farmer out in Iowa, or a sheep rancher in Idaho, or a cotton planter in Georgia, or the boy in a mountain village, or the average city-dweller?"

The answer is that this is a mechanical age, and the lives of each and every one of these persons is touched by the machine. Not only has the drudgery of farming been largely eliminated by modern farming machinery, but the multiple production made possible by the machine has given the farmer the status of a business man. Modern farming machinery is the offspring of machine tools. Modern carding and spinning machines—also the product of machine tools—have made it possible for the average person to be well and adequately dressed, both winter and summer, and thus have multiplied the market for wool and cotton.

The machine tool has placed the automobile within the reach of the masses and thus made it possible for thousands to travel into out-of-the-way places in search of rest or recreation, resulting in a distribution of money in otherwise comparatively destitute districts and thus affecting the future of ambitious mountain-bred youth. And the average city-dweller can thank the machine tool for the radio, automobile, vacuum sweeper, and many other conveniences and luxuries which would be beyond his reach if the high productivity of the machine had not brought the price down to a nominal figure.

See you at the Show!



# MODERN MACHINES ARE EXPECTED TO BE QUIET!

WHILE retaining the simplicity and dependability of gear drive Formica gear material makes it possible to produce machines that are much quieter in operation than those driven by metal gears. That makes the machines easier to sell. It helps maintenance men keep them running smoothly and sweetly as they should.

There has been a steady increase in the employment of this type of drive. It increases gear cutting tolerances and speeds up production.

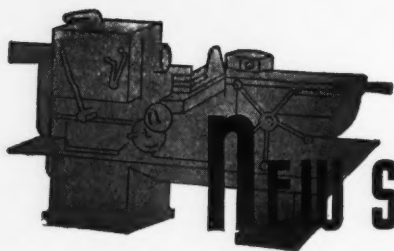
Replacement gears are available from the gear cutters named. They can usually make prompt delivery.

**THE FORMICA INSULATION CO.**  
4648 SPRING GROVE AVE., CINCINNATI, O.



## FORMICA GEAR CUTTERS

- The Akron Gear & En'g. Co., Akron, Ohio
- Farrall-Birmingham Co., Buffalo, N. Y.
- Slaysman & Company, Baltimore, Md.
- Harry A. Moore, Bangor, Maine
- The Union Gear & Mch. Co., Boston, Mass.
- Chicago Rawhide Mfg. Co., Chicago, Ill.
- Perfection Gear Co., Chicago, Ill.
- Gear Specialties, Inc., Chicago, Ill.
- Merkle-Korff Gear Co., Chicago, Ill.
- Chicago Gear Works, Chicago, Ill.
- Foots Gear Works, Cicero, Ill.
- The Cincinnati Gear Co., Cincinnati, Ohio
- Clarksville Foundry & Machine Co., Clarksville, Tenn.
- The Hirschburg & Scott Co., Cleveland, Ohio
- The Stahl Gear & Machine Co., Cleveland, Ohio
- The Master Electric Co., Dayton, Ohio
- Boal Foundry & Machine Co., Ft. Smith, Ark.
- C. A. Lawton Company, DuPere, Wis.
- The Adams Company, Dubuque, Iowa
- Hoeft Machine Co., Green Bay, Wis.
- Hartford Special Mch'ny. Co., Hartford, Conn.
- Beary Machine Works, Kankakee, Iowa
- The Generating Gear Co., Milwaukee, Wis.
- Bader State Gear Co., Milwaukee, Wis.
- Precision Machine Co., Milwaukee, Wis.
- E. A. Pruch Co., Minneapolis, Minn.
- Joaquin Alemany Lopez, Havana, Cuba
- The SPS Machine Works, Kansas City, Mo.
- Kennedy & Bowder, Nashville, Tenn.
- Natish Gear Works, Brooklyn, N. Y.
- New Jersey Gear & Mfg. Co., Newark, N. J.
- Prager, Inc., New Orleans, La.
- J. Morrison Gilmour, New York City, N. Y.
- Sier-Bath, Inc., New York City, N. Y.
- Mid-State Electrical Engineering Co., Osceola Mills, Pa.
- Peritan Machine Co., Omaha, Neb.
- E. M. Smith Machine Co., Peoria, Ill.
- The Eagle Gear & Machine Co., Philadelphia, Pa.
- The Pittsburgh Machine & Supply Co., Pittsburgh, Pa.
- Perkins Machine & Gear Co., Springfield, Mass.
- Winfield H. Smith, Inc., Springfield, N. Y.
- Ailing Lander Company, Soda, N. Y.
- Charles E. Crofoot Gear Corp'n., South Easton, Mass.
- Arlington Machine Co., St. Paul, Minn.
- Farwell Mfg. Co., Toledo, Ohio
- Diefendorf Gear Corp., Syracuse, N. Y.
- Barton Cook Co., West Point, Ga.
- Worcester Gear Works, Worcester, Mass.
- Massachusetts Gear & Tool Co., Woburn, Mass.



# NEW SHOP EQUIPMENT

## Blanchard No. 11 Surface Grinder

The Blanchard Machine Company, Cambridge, Mass., announces an entirely new small Blanchard Surface Grinder, the No. 11, which supersedes the No. 10 grinder. The new machine considerably surpasses the No. 10 in capacity, power and rigidity and is capable of very fast work. Its larger wheel operating at a lower wheel speed results in faster and cooler grinding with less wheel wear. In its design special attention has been given to ease and speed of handling, and all controls are conveniently placed for quick op-

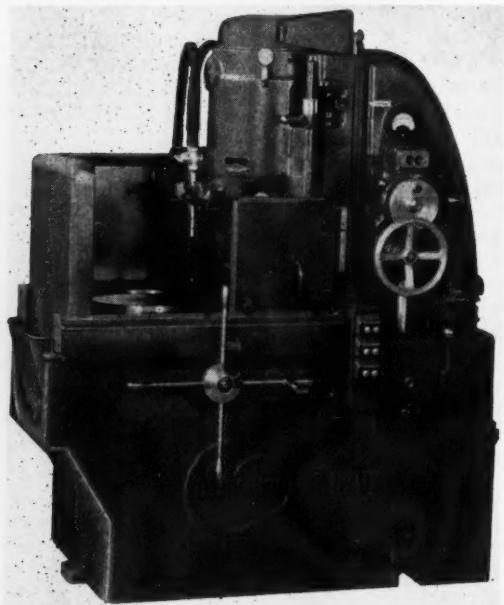
eration with a minimum of effort.

The machine is small and compact with weight distributed where it will produce the maximum rigidity. Numerous tests on one of these machines that has been in service for over a year show it to be exceptionally rigid as shown by the short time required to "spark out" and the accuracy of the work produced.

The No. 11 Blanchard Grinder uses a cylinder wheel of 11 in. diameter, 5 in. depth, and 9 in. inside diameter, driven by a 15 h.p. induction motor mounted on the wheel spindle and has a capacity for grinding work up to 20 in. diameter by 8 in. high under a new wheel. It is driven by a total of four motors, each direct coupled to its load. One of these motors provides for rapid raising and lowering of the wheel head by power, with push button control.

A new and improved type of feed gear box designed for this machine provides very easy and sensitive hand feeding, also power feed at rates varying from 0.004 in. to 0.070 in. per minute, with automatic stop. The feed and the rapid raising and lowering of the head are interlocked. Features common to other Blanchard Surface Grinders such as one-piece steel magnetic chuck, three-point adjustable column support, and easy cleaning base are incorporated in the No. 11.

The base of the machine serves as a tank for the coolant and has a capacity of



Blanchard No. 11 Surface Grinder

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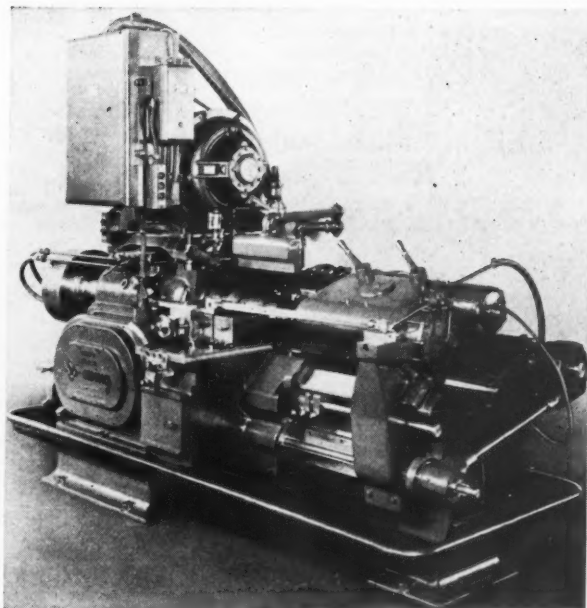


August



over 75 gallons. In an extension of the tank at the back of the base is the motor driven centrifugal pump supplying water to the inside of the wheel and to an outside nozzle through a  $\frac{1}{4}$ -in. pipe.

All controls are grouped convenient to the operator and all electrical control apparatus is mounted in one cabinet in the rear of the base easily accessible through a large door. The machine is shipped with all motors and controls wired in place and ready to connect. The No. 11 Grinder is very compact, having an overall length of only 5 ft. 3 in. and width of 3 ft. 16 in. The height of the chuck from the floor is 36 $\frac{1}{2}$  in.



Seneca Falls Model R-14 Lo-Swing Lathe

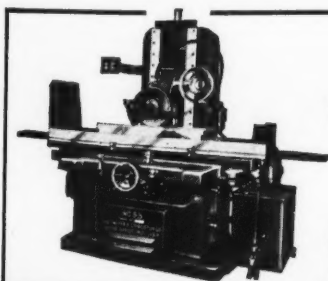
## Seneca Falls Model R-14 Lo-Swing Lathe

The Seneca Falls Machine Co., Seneca Falls, N. Y., has announced a new, heavier Model R Lo-Swing Lathe, to be known as the Model R-14. The Model R-14 is a fully automatic lathe equipped with the Seneca Falls all-mechanical quick change-over mechanism, which makes it possible to change the stroke by merely setting a graduated dial.

This lathe handles heavy multiple tool turning work 10 to 11-in. diameter and up to 36 in. between centers.

Model R-14 is now the senior member of the Lo-Swing line and incorporates the design and construction features which have long distinguished Lo-Swing Lathes. It is fully mechanical and so simple in construction that it is easily understood and can be serviced by any mechanic.

The machine illustrated is equipped with a special motor-driven tailstock



## GRAND RAPIDS Hydraulic Feed SURFACE GRINDERS

Make Possible Precision Grinding  
on a Production Basis.

Write for new Catalog GL100

**Gallmeyer & Livingston Co.**

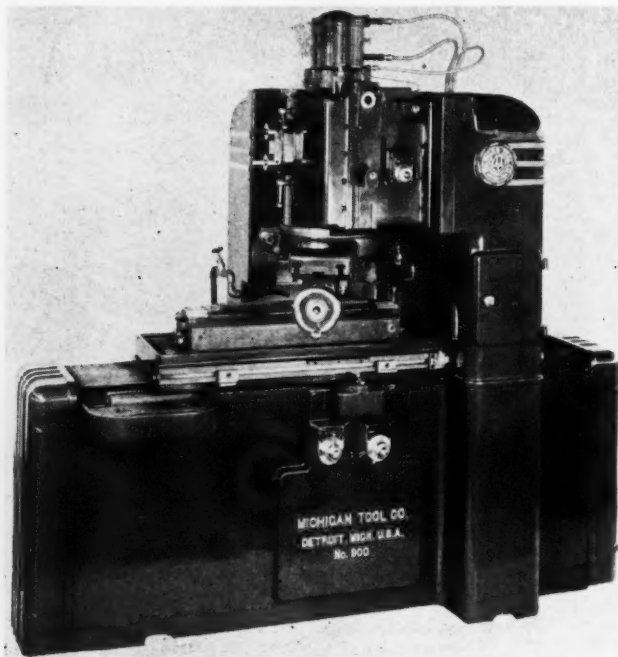
308 Straight Ave., S. W.

Grand Rapids, Mich.

to provide long travel. All Model R-14's can be equipped with an overhead Third Arm. This machine weighs slightly over 7 tons with average equipment.

## "Michigan" Model 900 Gear Finisher

A completely hydraulically operated, heavy-duty, high production gear finisher.



Michigan Model 900 Gear Finisher

isher has been announced by Michigan Tool Company, Detroit, Mich. Designated as the Model 900, the new gear finisher operates on the crossed-axes "shaving" method of cutting which is the feature of the smaller standard Michigan No. 854 rack-type gear finisher.

It embodies the same basic principle of operation in that a gear is cut by means of serrated cutters in a reciprocating horizontal rack with which the gear is "meshed" by feeding the work carrying head downward toward the

rack. The relation between gear axis and cutters is such (crossed-axes) as to provide a diagonal relative motion of the gear faces across the serrations in the rack blades, while the rack is rolling the gear.

Modernly streamlined in design, the new No. 900 embodies a number of important new features. In addition to hydraulic operation of the rack table, providing smooth operation and cushioned stroke reversal, both cross-feed

of the head and down-feed of the gear are accomplished by hydraulic means.

The cross-feed is designed so as to reciprocate the gear across the rack at a constant but adjustable rate of speed. The length of the stroke across the rack and the transverse portion of the rack over which the gear is reciprocated are also quickly adjustable. With this control, set-up is simplified and set-up time reduced, while improved finish and gear quality and more even distribution of wear over the rack are also reported.

The hydraulic down-feed mechanism in the No. 900 comprises a rapid approach and slower cutting feed. Cutting feed is adjustable by

means of a single valve from 0.0005 in. to 0.0025 in. per cycle of the table. Automatic stops are provided to stop the down feed when the gear has been properly sized. A dial setting is provided to automatically stop the rack after the desired number of "finishing" strokes.

The head then automatically raises through a rapid return, clearing the gear for unloading and re-loading. Trip dogs are provided to adjust the travel of the rack. Effective length of stroke is 3 in. greater than on the Model 854.

In the coolant system an interesting



## Here's a BETTER WAY

... **The Cincinnati General Purpose Grinders.** They set a new high standard for economical production... Motors are fully enclosed, dirt and dustproof. Wheel guards fully enclosed and adjustable. Push button starter with overload protection. Extra heavy pedestal. Large tool tray and water pot.

Write for descriptive folder on  
**THE CINCINNATI General Purpose Grinders and Buffers.**

# The Cincinnati

**ELECTRIC DRILLS • GRINDERS • BUFFERS • PORTABLE TOOLS**  
**The Cincinnati Electrical Tool Co.**



Type  
**GPTA**

*The Cincinnati  
Pedestal  
Grinder*

Electric Drills  
Screw Drivers  
Nut Setters  
Tappers  
Aerial Grinders  
Tool Post Grinders  
Bench and Pedestal Buffers  
Bench and Pedestal Grinders  
Abrasive Cut-off Machines

**2808-4 MADISON RD.  
CINCINNATI, OHIO**

combination reservoir and coolant cleaning tank has been worked out. This comprises 6 separate compartments in series with each other, with individual drain pipes. Coolant flows into the first compartment through a strainer, then over baffles into consecutive compartments, providing for progressive deposition of foreign matter. The fifth compartment is filled with steel wool for final filtering. A central lubrication system is provided to automatically oil all vital parts of the machine each time a gear is finished.

Structurally, the new gear finisher is notable for its massive construction. Head gibs are located directly over the center of the gear being finished, eliminating any tendency toward "weaving." The cross rail or bridge of the machine is a single piece casting for rigidity. Head and tail stocks are secured by 4 bolts in hardened and ground ways, eliminating the use of gibs for clamping the stocks, and providing a more solid anchorage.

The new No. 900 is designed to finish gears up to 8 in. diameter, with maximum length between centers of  $18\frac{1}{2}$  in. Machine operation is through a 5 h.p., 1,200 r.p.m. electric motor, located in base of machine. Weight, 9,600 pounds.

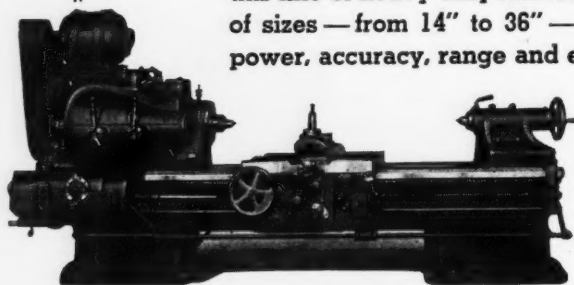
## H.E.C. Honing Machine

A honing machine the design of which is said to be a radical departure from the conventional honing machine designs is now being offered by Honing Equipment Corporation, 4612 Woodward Ave., Detroit, Mich. The machine is said to have many new and interesting features. The spindle operates vertically through the work table. Speed changes for reciprocation and rotation of the spindle are made independently, easily, instantly, and infinitely through knob controls which are within easy reach of the operator.

The electric control switch has a start, stop, and inch button. In addition, a foot pedal control is provided for instantly stopping the spindle without stopping the motor, this design permitting the operator freedom of both hands. The machine cannot be started with the foot lever. The hand control lever will start and stop the spindle and is engaged with the foot control lever so that when the spindle is started again, the foot lever is automatically set for stopping. The brake type clutch stops the spindle instantly when the clutch is disengaged.

# Boye & Emmes Lathes

Forty years of specialized manufacture are behind this line of heavy duty lathes. Made in a full range of sizes — from 14" to 36" — each of outstanding power, accuracy, range and economy.



MODEL "E"—24 INCH

*Write for  
complete detailed  
specifications.*

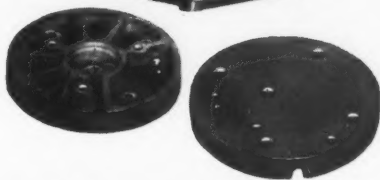
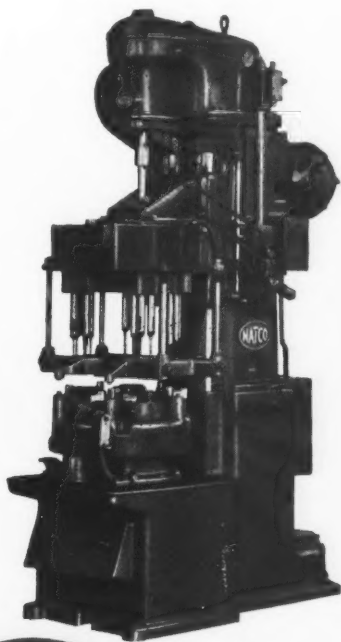
**THE BOYE & EMMES MACHINE TOOL CO.**  
CINCINNATI OHIO

# NATCO B-225H DRILLER

**FOR RAPID DRILLING  
EASE OF OPERATION  
DEPENDABILITY**

**This NATCO B225H Machine Drills and Countersinks Nine Holes in 150 Valve Plates Per Hour.**

This NATCO B225H drill head driller is being used by a prominent manufacturer. It is built with an 18-spindle drill head and a five-position fixture mounted on a hand indexed rotating table. This machine is of simple sturdy design . . . is easy to operate and will stand hard usage over long periods with little maintenance expense. Write today for complete literature.



Investigate  
NATCO Methods for  
the Lowest Possible  
Hole Costs!

**THE NATIONAL AUTOMATIC TOOL CO.  
Richmond, Indiana, U. S. A.**

# NATCO

## Drilling, Boring and Tapping Machines



## UNIVERSAL COLLET CHUCKS

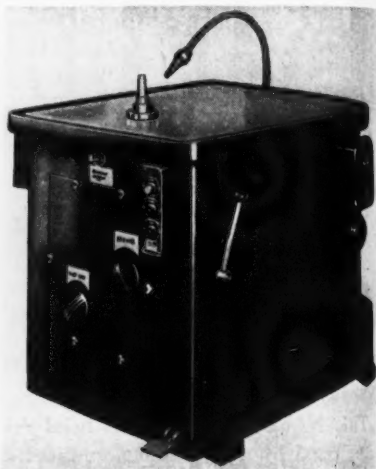
### *Ideal for* SINGLE PURPOSE DRILLING

Universal Collet Chucks, with ground threads hold drills with a firm, positive concentric grip on either the shank or flute. Write for new bulletin.

**UNIVERSAL**  
Engineering Company  
Frankenmuth, Mich.

The coolant reservoir is integral with the base and all of the operating mechanism, including the motors, is located in the cabinet type base. The spindle is of the spline type with ample bearings. Self-lubricating anti-friction bearings are used throughout.

The design of the machine is such that the work table is lifted clear for adaptation of any kind of fixture. The workpiece can be gaged without



H.E.C. Honing Machine

removing it from the machine or fixture.

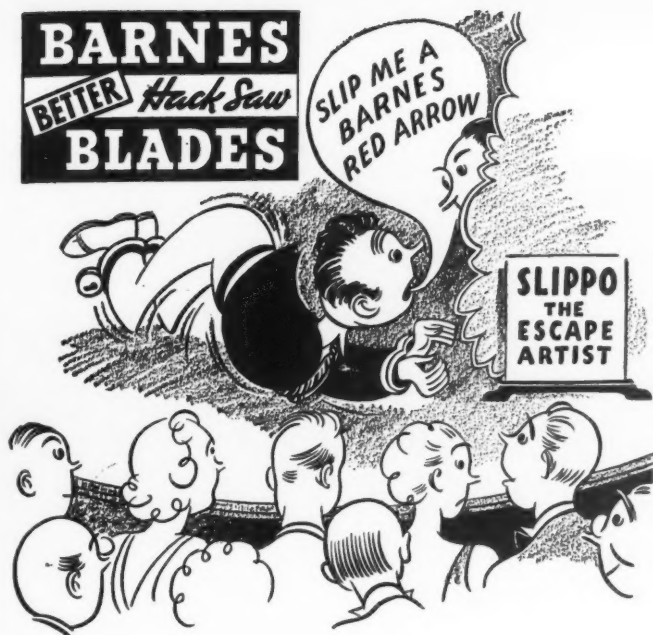
The machine shown, which is in actual operation, is equipped with a 1 h.p. motor and  $\frac{1}{4}$  h.p. pump motor. Reciprocation speeds are 700 to 1,000 cycles per minute and rotation speeds are 9/10 r.p.m. to 27 r.p.m. Bores up to 2-in. diameter can be honed.

## Sundstrand Automatic Stub Lathes

The line of automatic stub lathes built by Sundstrand Machine Tool Company, 2530 Eleventh St., Rockford, Ill., has been augmented by the addition of the Model 12. The design and general type of construction are the same as the Models 8 and 10, the principal differences consisting in that the machine is somewhat larger than previous models. heavier feeds are provided on the front



**BARNES**  
**BETTER** *Hack Saw*  
**BLADES**

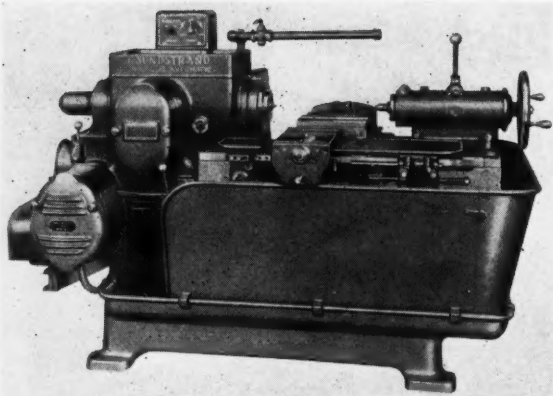


When a metal cutting problem has you on the spot, call for a Barnes Red Arrow. If that won't solve your problem some other blade in the Barnes Line will, for there's one for every metal cutting need.

Barnes Hack Saw Blades (there are six of them) and Barnes Band Saws (in widths from 1-16" to 1") are sold through distributors. Barnes Field Men, working through Barnes distributors, are qualified to demonstrate what each will do. To help **you** is their job. Make use of them.

For satisfaction, specify Barnes.

**W. D. BARNES CO. INC.**  
DETROIT MICHIGAN



Sundstrand Model 12 Automatic Stub Lathe

and rear slides, and the machine has more power.

Quick set-up and easy change-over are provided for by the simple Sundstrand Automatic Cycle Control. Of compact design, this unit eliminates necessity for making cams and provides complete control of all cycles by adjustments of dogs on a disc. The edge of the disc is graduated, aiding the operator to set up cycles quickly. All cycles are controlled by a total of six dogs, three of which are standard and three special. After a cycle has been set up, it can easily be checked by hand cranking or by using a lever to "inch" the lathe through its paces.

The stub lathe cycle is fast. Tools approach and return at a rate of 250 in. per minute, feeding at the highest rate the work will stand. A skip feed-dog rapid traverses the turning tools between separated surfaces except when rear slide facing is continuous. Rapid return takes place immediately upon completion of the cutting cycle.

A wide range of action for front carriage tools is provided by three units which can be used separately or in combination. These units control angular feed-in and tool relief, slow-up and dwell, and straight feed-in and tool relief. With these units, applications of the stub lathes can be extended to meet additional cycle requirements.

At the end of the operating cycle, the automatic tool relief moves cutting tools away from the machined surfaces, holds tools clear during quick return, then resets them exactly in original cut-

ting position. No machined surfaces are scratched and no tungsten carbide tips are chipped.

Central controls, adjustable dogs, accessible pick-off gears, and direct reading tables of speeds and feeds simplify operation, speed setting up, and make extensive operator-training unnecessary. The electrical control panel has one lever for safe stop, jog spindle only, jog whole machine, full speed automatic cycle to stop, and continuous operation. An adjacent button controls the coolant pump motor which is also in automatic cycle circuit.

The base, pan, bed, and headstock are all cast in one rigid, thick-walled, well-ribbed casting. The drive spindle is extra heavy, of alloy steel, heat treated, bored for draw rod, and threaded at the rear end for hydraulic or other chuck operating means. N.M.T.B.A. standard spindle nose facilitates mounting, driving, and changing work-holding devices.



Dogs are quickly adjusted for cycle control.



# PROOF

## THAT WE CAN HANDLE YOUR TOOL ORDER

Here it is . . . just off the press . . . a new bulletin describing the fast-growing Dayton Tool and Engineering Co.

It is chuck full of interesting facts and figures . . . filled with photographs of tools we have produced for many of the nation's leading manufacturers. It contains the very information

you want about our well organized, completely equipped tool shop . . . information that explains why Dayton Tool has expanded so rapidly in the last several years.

Why not send for your free copy today? **The Dayton Tool and Engineering Co., Dayton, O.**

*Your Own Shop Can't Match Dayton Tool  
For Accuracy, Speed, and Low Cost*

# The DAYTON TOOL & ENGINEERING Co.

Spindle drive is direct from motor through V-belts, pick-off and spiral bevel gears. The front carriage and rear slide are closely fitted to pressure lubricated hardened steel ways which are protected by the newest development in wipers. Automatic pressure lubricators force oil to the hardened steel ways and other bearings on the front carriage and rear slide.

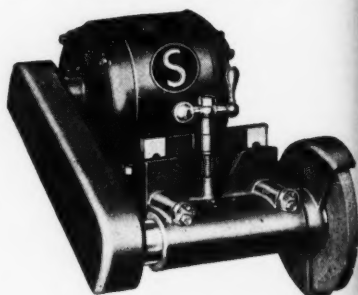
The base dimensions of the Model 12 are  $41\frac{1}{2}$  x  $73\frac{3}{4}$  in. and the floor space required is  $62\frac{1}{2}$  x 110 in. Height, 55 $\frac{1}{4}$  in. Center line of spindle to floor, 40 in. Weight, net, without spindle in drive motor, 6,650 pounds.

## Standard Type BPA Precision Grinder

Designed for adaptation to machine tools such as the lathe, boring mill, planer, and so on, the Standard Electrical Tool Company, 8th and Evans Sts., Cincinnati, Ohio, has brought out a precision grinder which can be used for either internal or external grinding. The grinder is available in sizes ranging from  $\frac{1}{4}$  to 10 h.p. The change from external to internal grinding is

made possible by the use of interchangeable spindle units.

Power is transmitted from the motor to the grinding spindle by belt drive. The wheel overhangs the front of



Standard Type BPA External Grinder

the machine, which allows a minimum of interference with the work. Grinding on centers is accomplished by means of a vertical hand adjusting screw for raising or lowering the spindle assembly. Either open or enclosed type of internal spindle assembly can be supplied, these being interchange-

**BENDING  
BRAKES**

# WHITNEY-JENSEN

**METAL  
TOOLS**

**No. 58** Capacity 2" Hole in 16 Gauge  
**FOOT PRESS**

Weight

Net....385 lbs.

Shipping

Weight...430 lbs.

Stroke of Ram.....1 in.

Ram Adjustment... $\frac{3}{4}$  in.

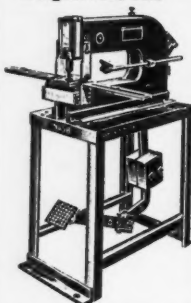
Punch Hole in Ram 1 in.

Depth of Throat...18 in.

Height of Throat 5 $\frac{1}{2}$  in.

Slug Clearance

Hole .....3x5 in.



## "Air Conditioning Special"

Attention, sheet metal men! Here is one of the most useful machines ever designed—a portable Bending Brake that you can carry to the job. Much duct work requires considerable fabricating at the time of installation and this machine will help you to do it quicker, faster, and easier. It has every important feature of larger brakes. Just the thing for crews working on air conditioning and ventilating jobs.



**No. 4**  
**Angle Iron Shear**

Capacity 2"x2"x $\frac{1}{4}$ "

Angle Iron



# WHITNEY METAL TOOL CO.

91 FORBES STREET

ROCKFORD, ILLINOIS



# BAY STATE TOOL WHEELS

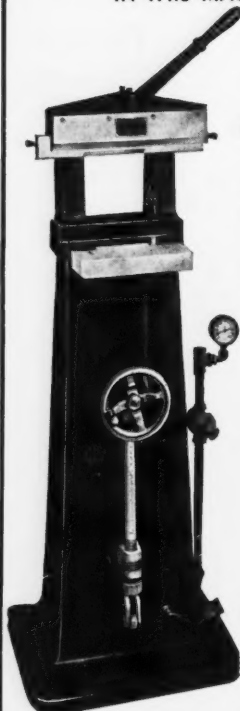
FRACTIONAL GRADES  
H 9 BOND

You can rely on BAY STATE'S  
consistently superior quality.  
Write for detailed informa-  
tion on Fractional grades and  
H 9 Bond.

**BAY STATE** ABRASIVE PRODUCTS CO.  
WESTBORO, MASSACHUSETTS



**YOUR PRODUCTS  
ALWAYS  
IDENTIFIED  
IF PERMANENTLY  
MARKED  
IN THIS MACHINE**



**MARKING  
BY ROLLING  
IS FAST AND  
ECONOMICAL.  
PRESERVES  
DIE LIFE AND  
PIECE PARTS.  
REQUIRES  
ONLY FRACTION  
OF  
APPLIED  
PRESSURE  
AS COMPARED  
TO  
STAMPING.**

**QUICK  
SET-UPS**

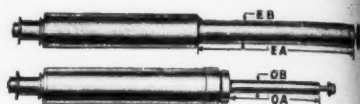
**MODEL 25  
HI-DUTY  
MARKING  
MACHINE**

This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

**GEO. T. SCHMIDT, Inc.  
1806 BELLE PLAINE AVE.  
CHICAGO, ILL.**

able and available in various lengths to meet diversified requirements.

An important feature of this tool is the ease and speed with which the change from external to internal grinding can be made. The spindle assembly

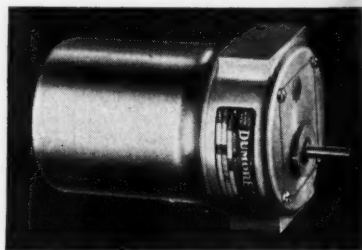


Internal Spindle Units for Standard Type BPA External Grinder

is held in position by two clamp screws and can be removed from the housing as a unit. A slot in the spindle housing slips over a dowel on each spindle unit, assuring a definite location for the spindle.

**Dumore Type El-Y Aircraft  
Motor**

Dumore precision has been combined with the exacting requirements of aircraft in the Type El-Y Aircraft Motor now being built by The Dumore Company, Racine, Wis. The motor is intended for use in aircraft or in auto-



Dumore Type El-Y Aircraft Motor

motive or nautical fields, wherever a low voltage unit is required. It can be wound for 115 volts for inline drive.

Weighing only 3 lbs., the Type El-Y Aircraft Motor is small, compact, and light. Gearing is of the spur type for maximum efficiency. The mechanism is enclosed in a rugged housing in which all screws are safely wired to withstand vibration. The carbon brushes and commutator are large enough to handle heavy currents without undue heating. Horsepower range



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How your local  
**UNION DRAWN DISTRIBUTOR**  
*can help*  
**YOU!**

standard  
screw  
housing  
e house  
spindle  
on for

craft  
combined  
of air-  
Motor  
Com-  
is in-  
auto-

● Your local Union Drawn Distributor can help you in numerous ways.

By carrying complete classified stocks of dependable quality cold finished steel bars, he saves you the trouble and expense of maintaining a ponderous inventory. He has the bars you need when you need them.

By being prepared to deliver steel bars promptly on short notice, he helps you avoid delays — makes it possible for you to start a rush job within a few hours' time.

Call up your local Union Drawn Distributor — or drop in to see him. Not only is he ready to furnish a single bar or a truck load — he is experienced in steels — can help you select the right steel for the job.



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**UNION COLD FINISHED STEELS**

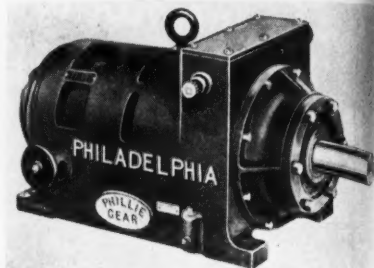
is 1/20 to 1/6 and the speed range available is from 200 to 1,200 r.p.m.

## Philadelphia PlaneTorque MotoReduceR

Philadelphia Gear Works, Philadelphia, Pa., has developed a motor drive which is said to provide unfailing protection for conveyors, agitators, mixers, and other equipment which might jam or become overloaded. The unit, known as the Philadelphia PlaneTorque MotoReduceR, shuts off automatically and instantly when the load exceeds a predetermined value. As soon as the excess load is removed, the unit is ready to start again without resetting. It is not necessary to rely upon fuses, thermal overload relays, or other devices to protect equipment from damage caused by loads jamming, catching, or becoming excessive.

The method of operation is as follows: Whenever excessive torque is imposed upon the output shaft of the PlaneTorque MotoReduceR, the increased torque required to rotate the planet gears mounted on the output

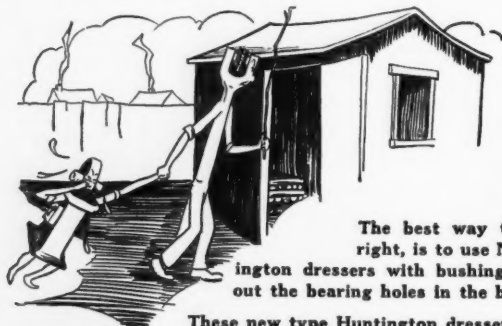
shaft spider transmits a higher torque to the internal gear, which is held in normal position by the lug and heavy spring. When the torque on the in-



Philadelphia Plane-Torque MotoReduceR

ternal gear exceeds a predetermined value, the torque spring is compressed which movement actuates the switch and disconnects the power.

The PlaneTorque MotoReduceR can be supplied for horizontal or vertical drives in all horsepower or ratios for industrial use. It can be supplied for



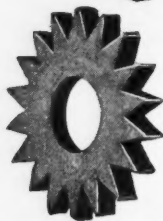
## SOMEBODY'S GOING TO GET A DARN GOOD DRESSING DOWN

TO get real performance from your grinding wheels, they need a good dressing regularly.

The best way to be sure the job is done right, is to use New Improved Vincent-Huntington dressers with bushings that can't turn and wear out the bearing holes in the handle.

These new type Huntington dressers, equipped with Milled tool steel cutters, heat treated by the "Vincent Process" to the proper degree of hardness and toughness, is your assurance that the dressing will be well done.

Call your nearest Mill Supplies distributor. Insist on the dressers with the aluminum finish.



Write for descriptive catalog sheets  
**Vincent Steel Process Co.**

2434 BELLEVUE AVENUE

DETROIT, MICHIGAN

"IF IT'S A HUNTINGTON DRESSER OR CUTTER VINCENT MAKES IT"

# BE THE MAN

*who gets credit  
for these economies*



See that your shop is equipped with the New Lincoln "Shield-Arc Junior!" In hundreds of plants, this low-priced welder is cutting costs and improving products, resulting in greater earnings for the company and increased prestige and recognition for the man who recommended its purchase. It will benefit you and your company, too. Here's how—

- It welds jigs and fixtures, cutting costs 20% to 75%.
- It reclaims tools and dies, saving up to 75% of replacement cost.
- It fabricates special machines and equipment at a fraction of usual cost.
- It repairs broken parts, saving replacement cost and expensive delays.
- It welds practically all metals and alloys easily and at minimum cost because:
- It is of d. c. motor-generator type with exclusive Lincoln "Job Selector" and Current Control, providing any TYPE of arc and any AMPERAGE for maximum welding speed and quality on every job... everytime.



**Investigate this new Lincoln Welder today!**

The price is exceptionally attractive. Consult the nearest Lincoln office or mail the coupon.

**THE LINCOLN ELECTRIC CO.  
Dept. E-622, Cleveland, Ohio**

Send details on New Lincoln Machine Shop  
Welder (Bul. 314-A).

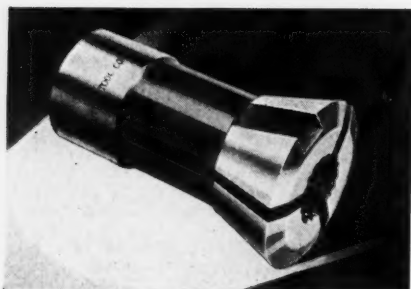
Name \_\_\_\_\_ Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

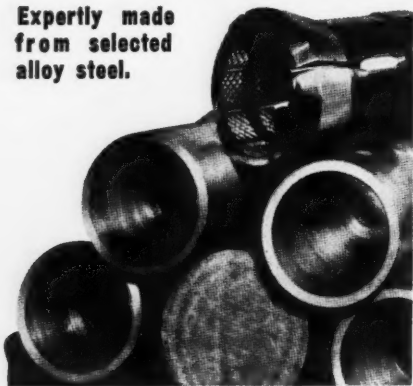
## Sutton DIAMOND GRIP Collets



◆◆◆ Beginning with the selection of the proper alloy steel every step in the production of Sutton Collets for screw machines is carefully controlled to deliver to your job the full advantage of the surer grip of DIAMOND SERRATIONS.

◆◆◆ For the full details on a Tighter Grip under Less Tension send for Sutton Catalog No. 12.

Expertly made  
from selected  
alloy steel.



## SUTTON TOOL COMPANY

2842 W. GRAND BLVD. DETROIT, MICH.

Represented in Canada by  
HI-SPEED TOOLS, Ltd., Galt, Ont.

clockwise or counter-clockwise rotation or for both if reversing service is desired.

## Boice-Crane Four-Spindle Drilling and Tapping Machine

The Boice-Crane Company, 1731 Newwood Ave., Toledo, Ohio, has announced a four-spindle, portable type drilling and tapping machine, incorporating the



Boice-Crane Four-Spindle Drilling and Tapping Machine

Boice-Crane Helmet-Head design. The columns are on 12-in. centers. One feature of the machine is the modern unit type floor base which is available with or without full swivel casters.

The machine can be equipped for practically any high speed drilling, reaming, and tapping job for a single operation or a sequence of operations on all metals. Optional equipment includes high speed or slow speed motors from  $\frac{1}{8}$  to  $\frac{3}{4}$  h.p., counterweighted heads for quick head positioning changes,  $\frac{1}{2}$  or  $\frac{5}{8}$ -in. capacity chucks  $\frac{1}{4}$  and  $\frac{1}{2}$ -in. high speed, quick reverse tapping heads, Morse taper socket or taper shank type spindles.

A two-spindle model with floor base is also available; the complete line includes a single floor and bench type machine, as well as two and four-spindle models for bench mounting.

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1937

*We took a tip  
from a tap engineer  
and everything's  
tip-top now*



"**WE** struck a snag on our last tapping job. Taps seemed to be breaking for no reason at all and the spoiled work was piling up. About that time a BATH engineer dropped in and we asked him for a little advice.

"Well, he looked around for awhile and suggested a change here and one there and when he was through, a blind man could see how much faster the work was moving. And the threads were better, too. He fixed up our trouble and saved us money to boot."

There's a BATH engineer in your vicinity who will be glad to give YOUR tapping problems the benefit of his training and experience. Don't wait until you run into trouble—call him now—there's no obligation.

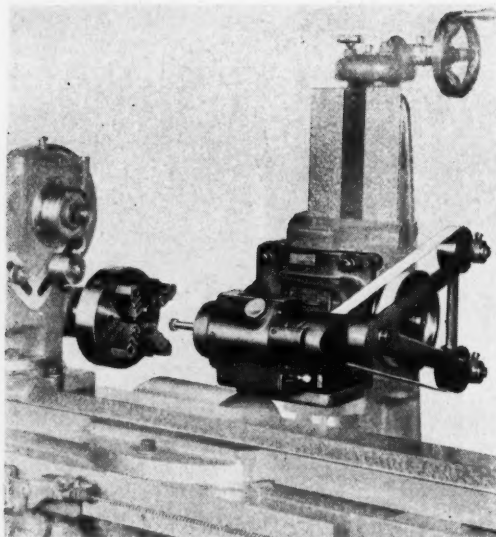
# JOHN BATH & CO.

WORCESTER • MASSACHUSETTS

*Pioneers in*

**"GROUND FROM THE SOLID" TAPS**





Brown & Sharpe Internal Grinding Attachment, Ball Bearing Type

### Brown & Sharpe Internal Grinding Attachment, Ball Bearing Type

The attachment shown here has been developed by the Brown & Sharpe Mfg. Co., Providence, R. I., for use with the Brown & Sharpe No. 13 Universal and Tool Grinding Machines and is designed for rapid and accurate stock removal.

The tapered, cartridge-type spindle unit is carried in a sturdy body casting which is mounted on a knee secured to the front of the wheel slide

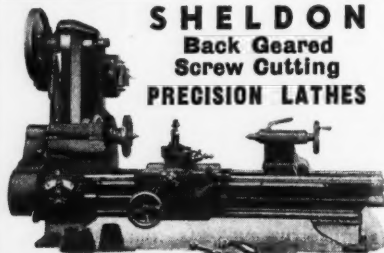
of the machine. The spindle driven from the machine spindle by a canvas belt, runs at 27,000 r.p.m. and is supported by two double-row self-aligning ball bearings. Oil is filtered before it reaches the bearings, and after it has passed, it is caught in a trap which can be removed and emptied. Wheel arbors are interchangeable and each is seated by a taper and held to the spindle by its threaded end.

The capacity ranges from holes with a minimum diameter of  $\frac{1}{4}$  in. and maximum length of 1 in. to holes with minimum diameter of  $\frac{1}{2}$  in. and maximum length of 2 in. A 4-jawed chuck, with jaws independent and reversible, is furnished with the attachment.

### Improved Ex-Cell-O Center Lapping Machine

Female centers, in parts held between centers and ground on the outside diameter, are quickly and inexpensively lapped on the Improved Ex-Cell-O Center Lapping Machine, product of Ex-Cell-O Corporation, 1206 Oakman Blvd., Detroit, Mich. Work with true, smooth centers may easily be ground straight and round, and with good finish.

The part to be lapped is placed on a vertically adjustable work rest and held by hand, while a lapping stone is brought down by a hand lever. The work rest is prevented from dropping by a cam, and is locked in position.



### SHELDON Back Geared Screw Cutting PRECISION LATHES

A complete line of full sized, full weight 10", 11" and 12" Precision Lathes...bench, floor and pedestal types built to industrial machine tool standards and specifications. Rigid heavily braced, semi-steel beds with hand scraped ways—2 "V"-ways and 2 Flat Ways. Large hardened steel spindles, ground all over and individually fitted into hand scraped bearings. Each lathe has a full complement of attachments and accessories. Each model gives more lathe per dollar.

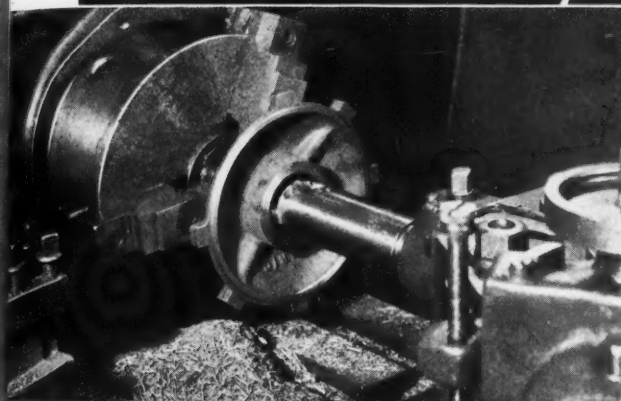
See the SHELDON before you buy.

**SHELDON MACHINE CO.**  
1626 N. Kilbourn Ave. Chicago, U. S. A.



*"Well pleased with this  
Davis Boring Tool"*

**DE WALT  
PRODUCTS  
CORP.**



## **Featuring: Sturdy, Rigid Construction- Extremely Fine Cutter Adjustment**

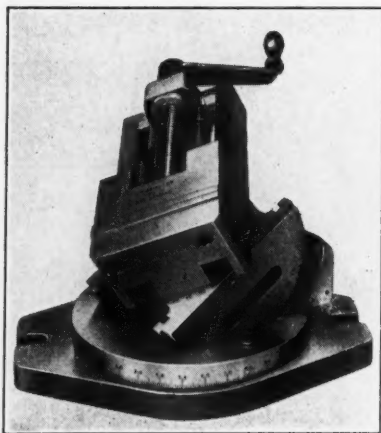
DeWalt, manufacturers of High Speed Woodworking Machinery, selected the Davis "Super" Micrometer Expansion Boring Tool for this job (boring gear housings), because it was necessary to hold a tolerance of .0002". In writing us about the set-up, they comment, "Needless to say, we are well pleased with this bar."

This new Davis "Super" Boring Tool — a complete innovation in boring tool design — features sturdy, rigid construction as well as extremely fine cutter adjustment. Undoubtedly this special Davis tool can be adapted for efficient, accurate, economical use in your plant.

*Send us prints of your special work and we will submit you a helpful, specific recommendation. Davis Boring Tool Division, Larkin Packer Company, Inc., St. Louis, U. S. A.*

# **DAVIS BORING TOOLS**

# The WESSON *all Steel* UNIVERSAL VISE



## Gives Faster Set-ups More Accurate Angles

The Wesson All-Steel Universal Vise makes the production of accurate compound angles quick and easy. Saves set-up time. Accurate graduations eliminate makeshift measuring. Completely graduated in all planes. Original "cradle" design and all-steel construction provide greater rigidity and permit faster stock removal. The price is right.

**Mill Supply Distributors: Valuable territories open for concerns with desirable contacts. Dealer inquiries invited.**

SEND FOR FREE FOLDER

**WESSON CO., 1050 Mt. Elliott, Detroit**

Please send me Illustrated Folder covering the Wesson Universal Vise.

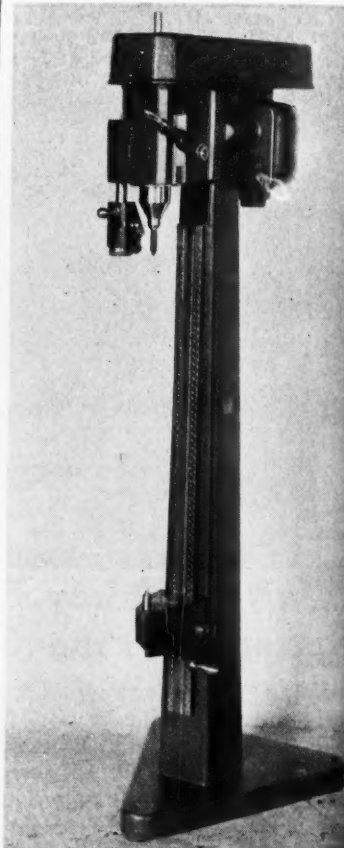
Name.....

Firm.....

Address.....

City..... State.....

by a hand crank. The lapping stone is mounted on an Ex-Cell-O Precision Ball Bearing Spindle. A totally enclosed bracket mounted on the column has a hardened and ground bushing



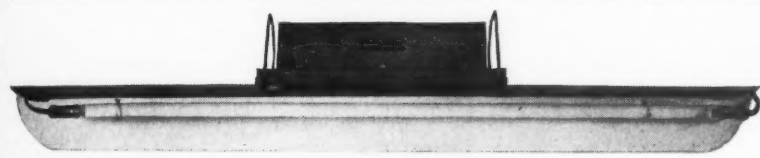
Improved Ex-Cell-O Center Lapping Machine

in which the spindle slides freely. The spindle is connected by an arm to counterweight in the column and is thus sensitive to lapping pressure.

Four-step pulleys, on the spindle and electric driving motor, give lapping speeds of 700, 1,300, 2,500, and 4,600 r.p.m. The machine laps centers up to  $\frac{1}{8}$ -in. diameter, in work up to 10 in. diameter, 36 in. long. With a special column, work 84 in. long can be lapped.

g stone  
decision  
ally en  
column  
bushin

TO MEET INDUSTRY'S DEMANDS FOR ECONOMICAL  
HIGH ILLUMINATION LEVELS... <sup>THE NEW</sup> COOPER HEWITT



## 100-watt fluorescent lamp

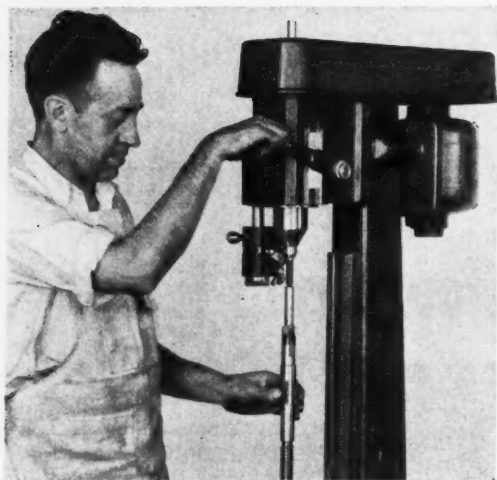


**C**ONSUMING only 100 watts, this lamp has an output of 5,000 lumens—the greatest output of any lamp of equal wattage now on the market. It provides a cool blue-white light, blending well with daylight. Details are easily seen. It is psychologically cool and actually cool from a physical standpoint thus decreasing the air-conditioning load. > > > Industrial plants of every kind will find it the answer to better employee welfare and better production which inevitably follows when lighting levels are raised and engineered to produce non-fatiguing illumination. Write for a copy of the new bulletin describing Cooper Hewitt Fluorescent Lamps. General Electric Vapor Lamp Company, 897 Adams Street, Hoboken, New Jersey.

"Better Than Daylight" engineered with Cooper Hewitt  
Mercury Vapor Lamps—Cooper Hewitt Fluorescent Lamps

**GENERAL  ELECTRIC**  
**VAPOR LAMP COMPANY**

986 F



Lapping center in end of shaft.

The lapping stone dresser is so mounted that it can be swung in or out of position. The dresser diamond is passed at a 60 deg. angle across the stone by a rack and pinion. The gear ratio produces a slow, smooth dressing stroke and consequently a better cutting surface on the stone. An adjustment on the dresser allows compensation for wear of the lapping stone.

### Tomkins-Johnson Improved Cylinder Construction

The Tomkins-Johnson Co., 620 N. Mechanic St., Jackson, Mich., is now hard chrome plating the inside of the

tubing bodies of the non-rotating cylinders built by this firm for compressed air and hydraulic use. A layer of approximately 0.001 in. of chrome is applied to the inside of the tube, providing an extremely smooth surface and one that will not rust.

It is well known that air or (water) hydraulic cylinders are susceptible to rust if left standing for any appreciable length of time due to the moisture from water or from the condensation of compressed air. This moisture acts as a lubricant in the hard chrome plated cylinders, increasing the smoothness of the surface instead of detracting from it. The result is less friction, prolonged packing life, and increased cylinder efficiency. The piston rod is also hard chrome plated to obtain the same smooth lubricated action effect at the piston rod packing.

The hard chrome plate is applied to all tubing bodies for cylinders up to and including 8-in. diameter bore and on the 10 and 12-in. diameter bore cylinders of strokes up to 7 inches.

### Kennametal Pump Valves

Pump valves and other valves subject to unusual abrasive or corrosive action are now being successfully made of Kennametal, the intermetallic compound of tungsten-titanium carbide manufactured by McKenna Metals Co., 300 Lloyd Ave., Latrobe, Pa. It is claimed that recent tests indicate that valves made of Kennametal last unusually long.

Illustrated in Fig. A are several high pressure needle valves equipped with

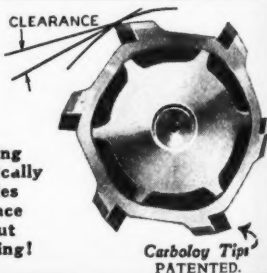
### No Other Reamer Saves You This!

Staples reamer eliminates regrinds after re-sizing. Provides parallel and equal outward expansion of tips, free cutting action and long life. Customers report as many as 30,000 smooth, accurate holes in low carbon steel without resharping. Write for leaflet. Sold thru Carboly Co., or direct from—

STAPLES TOOL & ENGINEERING CO.  
Cincinnati, Ohio

# STAPLES

Re-sizing  
Automatically  
Provides  
Clearance  
Without  
Regrinding!

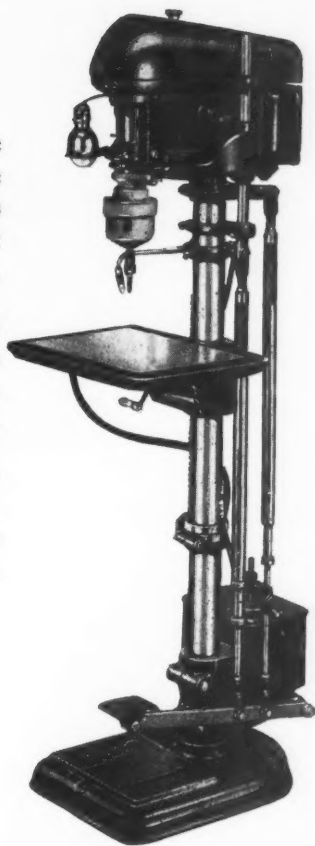


# Tested--Dependable Tappers

You will be money ahead if you use PROCUNIER Tested - Dependable Tappers. PROCUNIER Tappers are thoroughly tested and they won't fail you when you need them most.

You can depend upon PROCUNIER "Universal" Tapping Machines to give you the utmost in production, accuracy and trouble-free operation.

For tested, dependable tappers, PROCUNIER offers the greatest values. Use PROCUNIER tapping heads and tapping machines for smooth, sensitive high speed tapping.



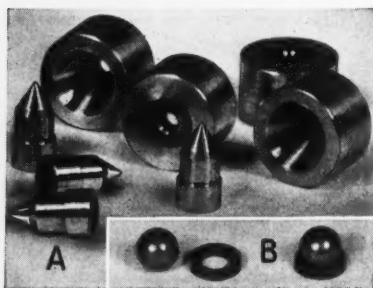
*Send for your copy  
of latest complete  
literature --- today.*

## PROCUNIER SAFETY CHUCK CO.

12 S. CLINTON STREET

CHICAGO, ILLINOIS

Kennametal needle tip and seat, which were used in experiments involving a tarry fluid containing grit. Previously it had been necessary to change as



Kennametal Pump Valves

many as seven valves in 24 hours; however, the Kennametal-tipped valves and seats gave such satisfactory service that it was necessary to replace only one valve every one to two weeks.

The strength of Kennametal balls and seats for oil well pump valves (Fig. B) is demonstrated by tests recently con-

ducted by a large oil well equipment manufacturer. In these tests Kennametal balls were hammered against seats of Kennametal by a pneumatic hammer, using 300 blows per minute of ram, 25 lbs. per sq. in. air pressure and  $\frac{3}{8}$  in. play between ram and ball and seat. After 105 minutes of hammering, the valves were still serviceable.

Kennametal can be supplied in any desired shape for valve parts and in three grades having varying physical properties.

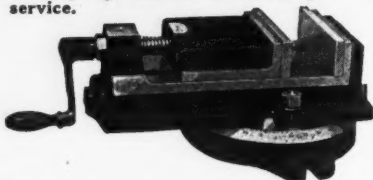
## Swedish Gage "Mikrokator"

The instrument illustrated herewith, product of Swedish Gage Company of America, 7310 Woodward Ave., Detroit, Mich., is intended for use in making unusually fine measurements. A revolutionary principle of frictionless amplification is said to be employed which assures positive repeat readings of unusual accuracy. There are no friction bearings, gears, levers, or other moving parts subject to wear. Due to the light weight of moving parts, the point-

## WHY PAY MORE -- Use L-W Products and Save Money

### 4-JAW INDEPENDENT LATHE CHUCKS

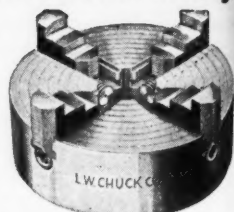
L-W Lathe Chucks are built with semi-steel construction and heavily ribbed body to withstand unusual strains. Four independent jaws made of accurately ground and fitted hardened steel are reversible and have  $1\frac{1}{4}$ " tough nickel steel screws. Best material and workmanship guarantee satisfactory service.



L-W also manufactures Magnetic Chucks, Demagnetizers, Dividing Heads and Power Hack Saws.

### Now Made in 5 Sizes

10"	....\$27.00
12"	.... 31.00
14"	.... 36.00
16"	.... 45.00
18"	.... 58.50



### SWIVEL MILLING MACHINE VISES

Large, Semi-Steel, 85 lbs. Made in Two Sizes

This large semi-steel vise which can be used plain or swivel is suitable for milling machine, drill press or shaper. Has sturdy  $\frac{5}{8}$ " steel jaws; key slots provide for attaching to machine table holding surface and jaws at right angles or parallel to table. Shipping weight 90 pounds.

$6\frac{1}{2}$ " size	.....\$27.00
$4\frac{1}{2}$ " size	.....\$19.50

Send for a catalog of the complete L-W Line.

## L-W CHUCK COMPANY

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# NATIONAL DEFENSE

IS DEPENDENT ON HIGH SPEED STEEL FOR THE  
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During the World War, the shortage of tungsten, the essential alloying element for high speed steel, was a major problem, and if it were not for **MO-MAX**, the same problem could arise again.

## MO-MAX

TRADE MARK REG. U. S. PAT. OFF.

IS THE STRATEGIC HIGH SPEED STEEL

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It is a proven quantity and has long since passed the experimental stage. Its use has increased in peace times until it is now the standard of quality for high speed tools.

For information, write

The Cleveland Twist Drill Co., Cleveland, O.

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## BUTTERFIELD TAPS

You don't buy taps . . . .

You buy threads, tap life and the profits that taps give you.

Compare Butterfield Taps with other taps for accurate threads and long life. The difference will reveal the superiority of Butterfield Taps and their profit possibilities.

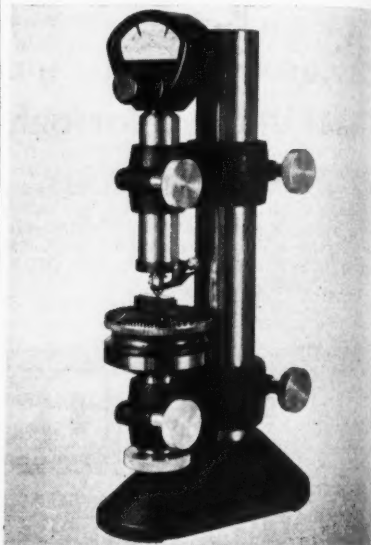
**Union Twist Drill Company**  
**BUTTERFIELD DIVISION**  
**Derby Line Vermont**

### STORES

New York - - - 61 Reade St.  
Chicago - - 11 S. Clinton St.  
Cleveland, 3346 Superior Ave.  
Detroit - 6540 Antoine St.

er is said to respond instantly to the slightest movement of the measuring tip without swinging past true reading and effects of vibration are negligible.

No lights or electro-magnets are used. Having no electrical connections, the instrument can be moved about for use in various locations or mounted on special checking fixtures to replace less reliable indicators. The instrument is furnished with scale graduated to 0.0001.



Swedish Gage "Mikrokator"

0.00005, or 0.00002 in. and scale divisions are of sufficient width to easily be read to one-half of a scale division.

The entire mechanism is under tension at all times; thus the slightest movement of the measuring tip is transmitted to the pointer. The reading of the instrument is exactly the same when the spindle moves upward or when it moves downward. To measure a flat piece or to set the instrument with Johansson blocks, the spindle is lifted by means of the lifting lever and released to take the reading.

### Stow Angle Head

An improved angle head designed especially for heavy duty operations with cup-shaped grinding wheels.

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Stow Angle Head

brushes, sanding, and polishing sets has been placed on the market by Stow Manufacturing Company, Binghamton, N. Y. The spindles of the unit are mounted in oversize grease sealed ball bearings and the ball bearings are mounted in steel inserts.

The Stow Angle Head is sealed against dirt and is furnished for either

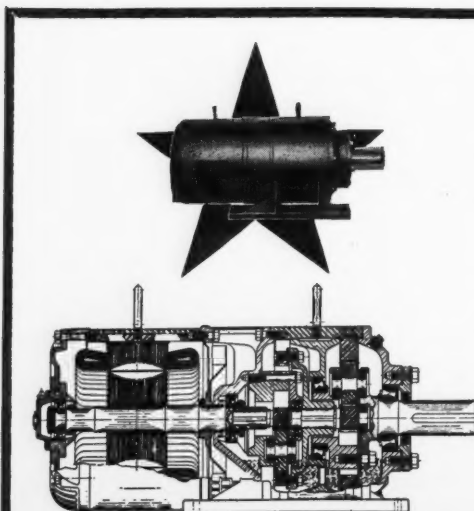
wet or dry grinding operations. The housing of each head is made of aluminum.

The cover with the valve mechanism is made of brass, thus ensuring a smooth working valve at all times. The diameter is  $3\frac{1}{2}$  in., and the height overall is  $6\frac{1}{2}$  in. The Stow Angle Head is constructed to run at speed ratios of from 1 to 1 to 20 to 1 reductions. This improved type angle head will fit Stow Flexible Shafts Nos. 2A, 3A, 4A, and 5A.

## B. & S. Silent Stock Support for Wire Feed Screw Machines

Designed for use in place of the stock support regularly furnished with the Brown & Sharpe Wire Feed Screw Machines, the Silent Stock Support illustrated herewith is said to eliminate objectionable noise created by the rotation of stock in the regular stock tube.

The stock rotates in a flexible metal guide, open at both ends and supported in a non-metallic casing, which deadens sound and prevents transfer of vibration. A grease gun connection facilitates occasional lubrication of the



# STAR

A.C. - GEAR MOTORS - D.C.

For pumps, mixers, dyeing equipment, washers, cranes, elevators, etc.

● This type STAR Gear-Motor is built in sizes from  $\frac{1}{2}$  to 75 h.p.\* With integral 1800 r.p.m. A.C. or D.C. motors, this type will provide output speeds between 132 and 56.5 r.p.m.\*

*Write for complete details and Catalog showing other styles also.*

STAR ELECTRIC MOTOR CO. BLOOMFIELD NEW JERSEY

# AT CHICAGO OCTOBER 23-27 20th NATIONAL METAL CONGRESS AND EXPOSITION



Chicago—second largest American city—a seven million dollar market where one-eighth of the nation's manufacturing is done . . . is an ideal setting for the greatest annual event in the metal industry—the National Metal Exposition.

A quality attendance of 20,000 is predicted by the four great technical societies who have their annual conventions in connection with the Metal Exposition. Admitted by invitation only, the Metal Exposition audience is a gilt-edged prospect list delivered right to your booth.

With this assured attendance, it is not surprising that 75,000 square feet of space are sold already—185 companies already signed—to exhibit in this 20th annual Metal Exposition.

If you sell the metal field—investigate this great show immediately! Choice spaces are going fast. Write for floor plan, list of exhibitors and complete details. Address W. H. Eisenman, Director, National Metal Exposition, 7016 Euclid Avenue, Cleveland, Ohio.

## Products to be Exhibited

Heat Treating Equipment and Supplies  
Safety Equipment and Supplies  
Induction Hardening Machines  
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Electroplating Units  
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Testing Equipment  
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Melting Furnaces  
Spring Machines  
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Electric Motors  
Brazing Alloys  
Metal Powders  
Billet Heaters  
Lock Washers  
Carbide Tools  
Electric Tools  
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Die Blocks  
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Screws  
Tools  
Bricks  
Steel  
Wire  
Dries  
Iron

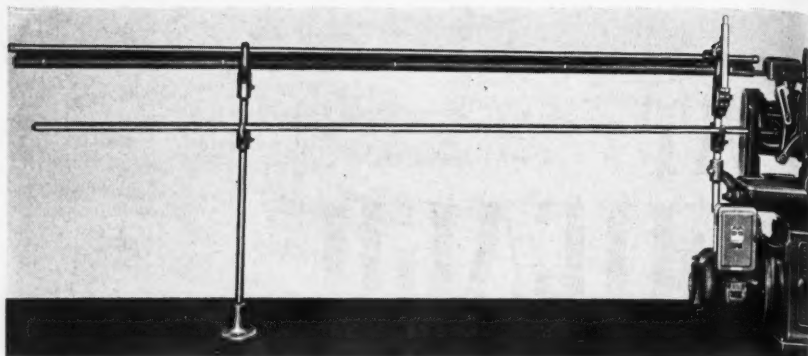
## Co-operating Societies:-

American Society for Metals, Wire Association, Institute of Metals Division and Iron and Steel Division of A.I.M.E., American Welding Society.

# NATIONAL METAL EXPOSITION

## OCTOBER 23 - 27

### INTERNATIONAL AMPHITHEATRE—CHICAGO, ILLINOIS



B. & S. Silent Stock Support

side of the flexible guide. The casing is free to slide in the outer support bracket and is secured to the inner support bracket by a simple swing latch which prevents creeping during the operation of the machine.

A new bar is inserted in the machine end of the Silent Stock Support by transferring the inner support bracket to the loading position stud, this stud having a vertical adjustment to assure the bar clearing the machine. With the bracket back in operating position, the new bar is easily inserted in the machine spindle.

The support is made in four sizes designed to take stock up to the capacities of the machines. It is a product of Brown & Sharpe Mfg. Co., Providence, Rhode Island.

### SKF Rubberflex Pillow Block

In answer to the demand for a compact, sound-insulated pillow block, SKF Industries, Inc., Front St. and Erie

Ave., Philadelphia, Pa., is introducing the "Rubberflex" Pillow Block shown in the illustration.

This unit comprises a self-locking bearing of the SKF "Grip-lock" type. The bearing is inherently aligning, thus compensating for inaccuracies of set-up and conditions of shaft misalignment without binding or in any way impairing the load-carrying capacity of the bearing. In addition, the use of this unit is said to bring about manufacturing economies because it requires no machining of the shaft.

The bearing is encased in a pressed steel housing equipped with felt seals to exclude dirt. The housing is provided with means for lubricating the bearing. The bearing and housing are surrounded with an elastic material having special sound-absorbing characteristics, and the material has been specially treated to make it impervious to oil and grease. Free from objectionable vibration, this unit carries substantial loads under practically all opera-

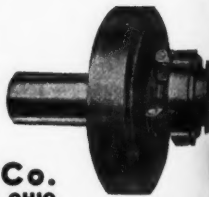
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Install this superior clutch on those hard or troublesome drives, and end clutch problems for good. Performs best because it is designed, and built best. Releases instantly at high or low speed, and can quickly be adjusted for liner wear.

Complete data on request.

**The Edgemont Machine Co.**  
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# *Your Personal Guide* *to the*

## **MACHINE TOOL SHOW**

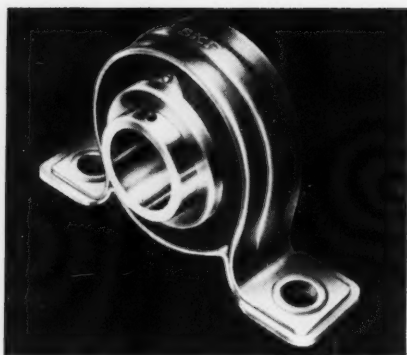
■ ■ The September Machine Tool Show Issue of MODERN MACHINE SHOP has been carefully planned to effectively serve as your personal guide to the Show. Handy pocket size, convenient spiral binding, complete floor plans, list of exhibitors, machinery and equipment index, list of personnel in attendance in booths, previews of machinery and equipment, extra memoranda and sketch pages, and other features will be incorporated for your convenience. Your copy will reach you well in advance of the Show opening. We suggest that you thoroughly review your number before attending the Show — and be sure to take it with you as your personal guide.

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### **MODERN MACHINE SHOP**

**431 MAIN STREET • CINCINNATI, OHIO**

**THE MOST WIDELY READ MAGAZINE IN THE METAL-WORKING FIELD**



**SKF Rubberflex Pillow Block**

ing conditions. Its unit construction facilitates mounting.

The SKF Rubberflex Pillow Block constitutes a rugged, inexpensive unit which is said to have wide application in those fields requiring anti-friction bearings with unusually quiet operating characteristics. The units are being marketed in  $\frac{3}{4}$  and 1-in. shaft sizes.

## IF YOU USE TAPS YOU NEED WALTON TAP EXTRACTORS



The price of a new tap is nothing, compared to the cost of removing the broken one by any other method. WALTON BACKS it out; saves the thread (and your time.)

Stock sizes #4 to  $1\frac{1}{2}$ " in 2, 3 and 4-flute styles. Sent on 30 day free trial. Booklet 132 gives details and prices. Write for it today.

**The Walton Co.**  
98 ALLYN STREET  
HARTFORD, CONN.

## Coffing "Power Master" Controlled Gravity Lowering Chain Hoist

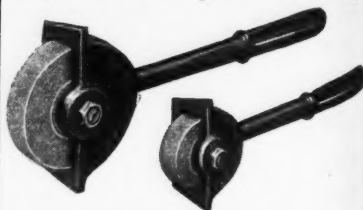
Coffing Hoist Company, Danville, Ill., has placed on the market the Coffing "Power Master" Controlled Gravity Lowering Chain Hoist, illustrated herewith. Advantages of the hoist are said to be controlled gravity lowering; that is, lowering speed controlled by the clutch and governors, positive action; the ability to stop the load at the fractional part of an inch, and no hand-over-hand operation of the chain to lower the load. Another feature is the free chain for quick up-or-down load chain adjustment. When there is no load on the hoist, pulling down on the right side of the hand chain permits



Coffing "Power Master" Chain Hoist

## Reamer and Cutter Grinder

will save you money



### Knock-Out Abrasive Wheel Dressers

do as good a job as a diamond but cost much less to use. No pressure is necessary as best results are obtained by just touching. Dressing a wheel requires just a few seconds.

Hardened adjustable bearings last indefinitely as they are constantly lubricated by oil wick. Send for bulletin E37M.

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Styles 7 x 17 and 6 x 13



Developed to meet demand for chucks lower than our standard style.

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## The Logical Choice for any Type of Work



Fig. 732

Pat'd and  
Pat's Pending  
Drawer is extra

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**give you all three  
of these advantages**

### 1. Smooth Working Sur- face

One piece of sturdy steel, perfectly flush... stays smooth... can't get oil soaked... won't splinter or split.

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Flanged steel legs permit permanent rigidity and assure steady working surface.

### 3. Easy Movability

Easily taken apart, moved to new shop locations and reassembled, firm and strong as ever. Any number of "Hallowell" Benches may be joined end to end for a long continuous working surface. Neither of these advantages are possible with a wooden bench. 1367 "Hallowell" Bench combinations available to fill your needs exactly and without delay... generally shipped from stock. Prices surprisingly low. Send for our Shop Equipment Bulletin.

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PRESSED STEEL CO.**  
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### DROP FORGED STEEL

Standardized Die Sets, embodying many exclusive features, a listing of more than 185,000 stock sizes and 46 different styles afford a service that is unsurpassed.

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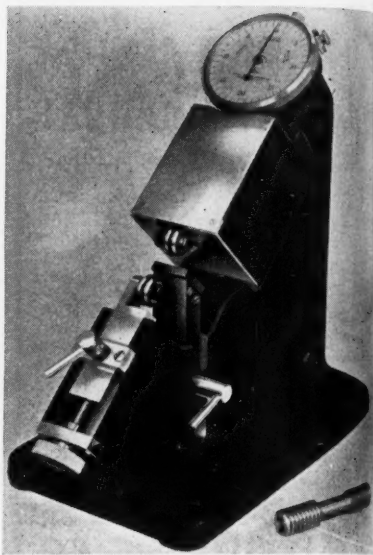
**E. A. BAUMBACH MFG. CO.**  
1806 S. Kilbourne Ave. Chicago, Ill.

the load chain to be adjusted to the load without a lot of waste motion on the hand chain. This feature is said to be not only time-saving but also fool-proof, as there are no ropes or other devices to confuse the operator, and it is impossible to drop the load.

Lubri-sealed ball bearings are used in the hoist. The planetary gear system is sealed and runs in oil. The Power Master is equipped with special Diamond chain. It is built in capacities ranging from 1 to 8 tons, with unit weights as low as 86 lbs. for the 1-ton and 169 lbs. for the 8-ton type. All Power Master hoists are factory tested at 100 per cent over-rated capacity.

### Federal Thread Pitch Diameter Gage

A thread pitch diameter gage which provides a means for rapidly checking the pitch diameter of screws, bolts, plugs, taps, and so on, has been introduced by the Federal Products Corp., 1144 Eddy St., Providence, R. I. The gage, as shown in the illustration, is provided with John-Son roller contacts. The upper roller is mounted in such a



Federal Thread Pitch Diameter Gage Model 45B-57

**VISE**

Jaws 6", 9" and 12" Long  
For DRILL PRESS. Often used  
on Miller,  
Shaper,  
Planer.



Fig. 2. Without Jig Attachments

**DRILL SPEEDER**

or  
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For use in Drillers from 20-in. to largest Radial. Suits Straight or T. S. Drills up to 3/4" with Speeds to 3,000 Rev.

Increases Speed 3 Times

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69 Willard Ave., Providence, R. I.



manner that the sensitivity and accuracy of the gage is greatly increased. The lower roller is mounted on an adjustable slide. Both rollers can be quickly interchanged and set for various sizes of work. A back stop is provided as a means for locating work between the rollers. This stop can be adjusted to accommodate different size pieces of work.

The indicator of the gage is graduated in 0.0005 in., and has a range of 0.300 in. The Federal Thread Pitch Diameter Gage is designed to measure work in diameter up to 1 in., and is furnished with one set of John-Son rollers of a size to meet requirements. The base is 5 x 7 3/4 in.; height, 9 1/4 in.; net weight, 15 1/2 pounds.

### Laidlaw Type JMR-20 Metal Cutting Band Saw

Wm. Laidlaw, Inc., Belmont, N. Y. announces what is said to be the first metal cutting band saw which is capable of cutting accurate radials with diameters ranging from 1 1/2 in. to 9 in. The machine, known as the Type JMR-

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air from  
cylinder  
way to the  
curved in-  
quiet op-

Believed  
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preventing  
or vacuum  
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this alloy  
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No opening  
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INLET  
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for stand-  
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No compo-  
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like, in  
a perfec-  
and posi-  
or vacu-

Big air  
from ene-  
curved

Quicker assembly . . .  
Lower cost with  
**WHITNEY**  
*Woodruff*  
**KEYS**



• Whitney keys are easily fitted — because they're accurately made. That means time-saving, money-saving assembly of shaft and keyed member. Yet Whitney keys reach deep in the shaft, stand greater strain, can't roll over. Write for Catalog V-111 and price list.

**The Whitney Chain & Mfg. Co.**  
HARTFORD • CONNECTICUT

**Gammons**  
**REAMERS**  
AND  
**END MILLS**

ORIGINATORS of the Helical Taper Pin Reamer. Special Reaming Problems Invited. Immediate Shipment on Stock Tools.

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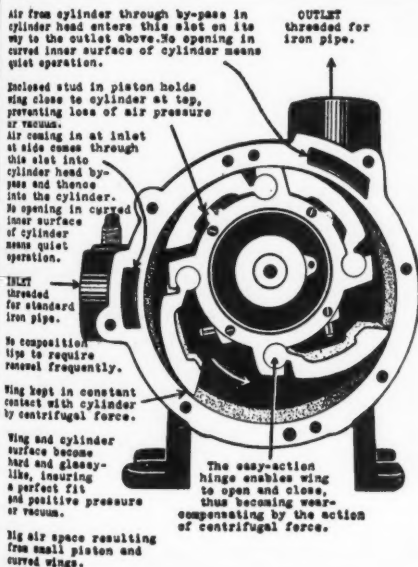
**SPIRAL SPECIALISTS**  
THE GAMMONS-HOLMAN CO. MANCHESTER, CONN.

**LEIMAN BROS. PATENTED**  
**HIGH PRESSURE**  
**BLOWERS**  
AND  
**VACUUM PUMPS**  
**GAS BOOSTERS**  
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For Gas Furnaces -- Blow  
Pipes -- Oil Burners --  
Gas Machines -- Atomizing --  
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Devices.

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Makers of Good Machinery For Fifty Years



## KELLY SHAPERS

RESPOND TO



Since 1895

## CONVENIENT CONTROLS

BUILT BY

General Engineering & Mfg. Co.

ST. LOUIS

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## CYLINDRICAL SUB-PRESSES

May be adjusted for wear and so perfect alignment can be maintained. This means that the quality of the punchings will not vary and that the life of the dies is increased. Nine diameters of plungers in arch and overhang types in stock. Ask for booklet on Sub-Presses and Dies.

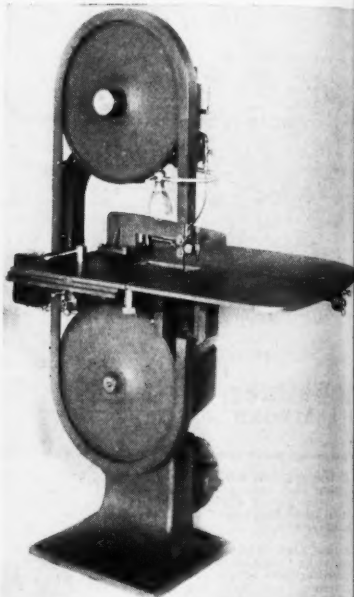


ARCH TYPE

**Waltham Machine Works**

WALTHAM, MASS.

20 Band Saw, is powered by a 1 h.p. 1,750 r.p.m. motor and offers two speed ranges of 50 to 365 feet per minute—100 to 725 feet per minute—saw trans-Frame, saw wheels, guide arm, and table are Meehanite metal in order to provide strength, rigidity, and fatigue endurance. Ball bearing roller



Laidlaw Type JMR-20 Metal-Cutting Band Saw

guides are used with blades which may range from  $\frac{1}{4}$  in. to  $\frac{3}{8}$  in. Clearance of  $2\frac{1}{2}$  in. is provided beneath the guide arm of the radial control screw.

## Acheson Colloidal Graphite for Delicate Mechanisms

A method of lubricating the moving parts of such delicately adjusted mechanisms as are found in orifice type flow-meters can be adapted to fields where "permanent" type lubrication must be combined with pressure-sealing, fluid-proofing, and temperature-resisting properties. As a result of tests to find a lubricant for the die-sional shafts and adjacent lapped be-

ings of  
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sulphide  
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L.F.

August,



ings of a meter through which gas containing 650 to 675 grains of hydrogen sulphide per 100 cu. ft. and under pressures up to 50 lbs. per sq. in. was being metered, a suitable lubricant was developed by the Acheson Colloids Corp., Port Huron, Michigan.

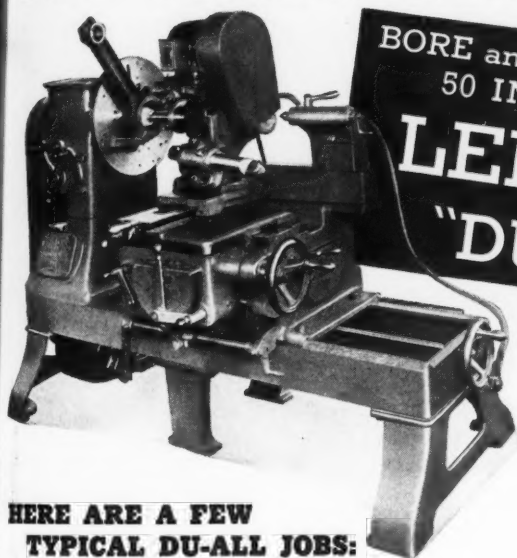
After a series of studies and tests involving different types of lubricants and including the use of packing glands, stuffing boxes, wax cartridges, and so on, it was discovered that by mixing Acheson colloidal graphite with pure castor oil, a lubricant was produced that met the requirements for the job by providing a sealing action without mechanical pressure means and with-

out increasing the carrier viscosity.

## Mauser Universal Bevel Protractor

The George Scherr Company, 130 Lafayette St., New York, N. Y., announces the Mausер Universal Bevel Protractor, a precision tool which has been designed to meet the requirements of tool-makers, engineers, layout men, and mechanics. It may be used for all types of work where angles must be laid out or measured. The dial is graduated in degrees for the full circle in  $4 \times 90 = 360$  deg. A vernier is provided which

## CUT PRODUCTION COSTS!



BORE and GRIND On the  
50 INCH SWING  
**LEMPCO**  
"DU-ALL"

Here's a machine that fills a big gap in the industry. With it's 50-inch swing and precision grinding and turning turret-head it does the work of two much more costly machines. Highest quality construction throughout assures the last word in accuracy on all jobs. Standard equipment includes reversible water pump and six-foot bed. Any size bed can be provided on order. Write Dep't. 1-D for catalog.

### HERE ARE A FEW TYPICAL DU-ALL JOBS:

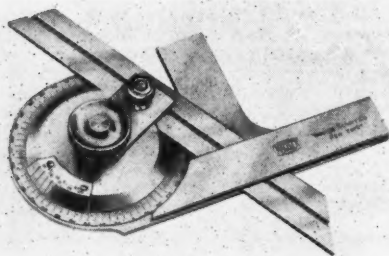
General Internal Grinding . . . Surface and Face Grinding . . .  
General External Grinding . . . Large and Small Connecting  
Rods . . . Turning . . . Boring . . . Surface and Face Turning  
. . . Forming Dies . . . Deep Drawing Dies . . . Blanking Dies.

**MAKE US PROVE IT—SEND FOR CATALOG** (A few territories still open for dealers.)

**LEMPCO PRODUCTS, INC., Bedford, O.**

gives readings within five minutes of the arc (1/12th of a deg.).

The graduations on both the main



Mauser Universal Bevel Protractor

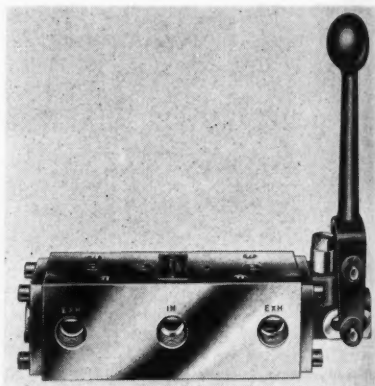
dial and on the vernier are very finely etched with jet black markings, making readings quick and simple. The tool may be obtained with either 6, 8 or 12-in. blades, which are bevelled at each end to 45 and 60 deg. respectively. The back of the tool is finished flat so that it may be flush when laid on work or paper. The dial may be clamped inde-

pendently of the dial.

It is claimed that layout men find the Mauser Universal Bevel Protractor useful in laying out angles and toolmakers frequently use it in checking work. The Mauser Universal Bevel Protractor has been placed on the market as an item for the individual mechanic's tool kit.

## Hunt Single Plunger Air or Hydraulic Valve

C. B. Hunt & Son, 1935 E. State St., Salem, Ohio, has brought out a valve for either air or hydraulic use, the design of which is said to afford many advantages to machine designers and engineers. The valve has only one moving part and thus, with outlets and inlets in the sides, it can be serviced on the job without disconnecting. Having individual exhaust outlets controlling each end of a double-acting cylinder, speed control of the piston is easily



Hunt Single Plunger Air or Hydraulic Valve

obtained independently in either direction.

Construction is sturdy, the most commonly used sizes having extruded brass housings. The "Quick-As-Wink" patented valve principle, with balanced action always in effect, is used in this design. There is no metal-to-metal contact, so no lubrication problem exists. The higher the pressure, the tighter the seal. The valve is made in 25 styles, in sizes from 1/8 to 1 1/2 in., inclusive.

## COST CUTTING TOOLS

GROUND RADIAL RELIEF



CIRCLE "R"

### Combination Center Drills

Will give more production at less cost. Be sure to demand Circle "R" Tools.

Send for Catalog "J"

**CIRCULAR TOOL CO., Inc.**

PROVIDENCE • RHODE ISLAND  
BRANCHES—Chicago, Detroit, Indianapolis, Philadelphia, Cleveland, New York

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## NEAT STAMPING in NAME PLATES



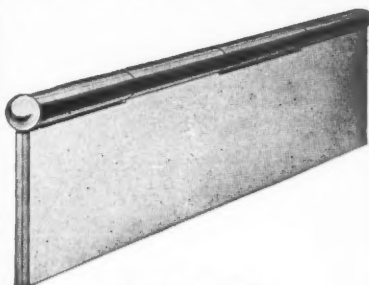
This machine quickly stamps details and serial numbers into name plates.

*Write for Particulars*

**GEO. T. SCHMIDT, Inc.**  
1806 Belle Plaine Ave. Chicago, Ill.



## CONTINUOUS HINGES



Manufactured by  
**AUTO MOULDING  
& MFG. CO.**

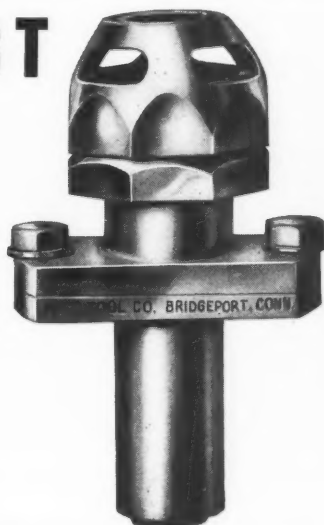
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*WRITE FOR STOCK LIST*

# ALCO'S LATEST

**an Acorn Type  
Die Holder with  
adjustable concentric  
alignment.**

This new ALCO Tool embodies the same adjustable concentric alignment feature which has made other ALCO Tools — Drill Chucks, Tap Holders, Button Type Die Holders — so popular with screw machine users. Better work at a lower unit cost and a reduction in costly rejections make this a good buy for you. Write today for full particulars. Alco Tool Co., Bridgeport, Conn., U. S. A.



# ALCO TOOLS

EFFICIENT

## Positive Roll Grip Keyless Drill Chuck

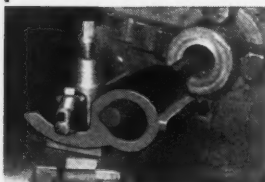
The Motor Tool Mfg. Co., 12281 Turner Ave., Detroit, Mich., announces the addition of a positive roll grip keyless drill chuck to its line of tools. The chuck consists essentially of three SAE-52100 hardened and accurately ground tapered rolls that run between a hardened and ground cam and the drill shank. As the rolls, which are retained in the chuck by means of a spider or roll retainer, climb the cam, the cam

grips the drill shank. The greater the load on the drill, the tighter the chuck grips the shank. A slight twist of the wrist releases the chuck and enables the drill to drop out without the use of a wrench or key. In order to



Positive Roll Grip Keyless Drill Chuck

## BORING BAR HOLDER



HOLDS ANY SIZE BAR FROM  $\frac{3}{8}$ " TO 2" DIAMETER. Can be used on 16" to 30" lathes. Rocker legs elevate bar to center line of lathe.

**DUKE** • 435 S. Senate Ave. Indianapolis, Ind.

## SMALL GEARS

—in the finer Pitches—14 to 96 D. P.

**SPURS WORM-  
SPIRALS GEARING  
HELICALS RACKS  
BEVELS RATCHETS**

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A few pieces or a million.*

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2620 W. Medill Ave. Phone-Humboldt 3482

resist wear and burring, the tapered rolls of the chuck have been tempered.

The Positive Roll Grip Keyless Drill Chuck is available in four capacities: Type A for drills  $\frac{1}{8}$  to  $\frac{1}{4}$  in.; Type B,  $\frac{1}{4}$  to  $\frac{3}{8}$  in.; Type C,  $\frac{3}{8}$  to  $\frac{1}{2}$  in., and Type D,  $\frac{1}{2}$  to  $\frac{3}{4}$  in. It is furnished in three body sizes of  $\frac{1}{8}$  x  $1\frac{1}{4}$  in.,  $1\frac{1}{4}$  x  $2\frac{1}{2}$  in., and  $2\frac{1}{4}$  x  $3\frac{3}{4}$  inches.

## Norton Applies Kerosene Lubrication to Grinding Wheel Spindles

Norton Company, Worcester, Mass., announces that all grinding machines of Norton manufacture are now built with kerosene lubrication applied to the grinding wheel spindle. Kerosene lubrication is said to provide a number of outstanding advantages, one being the low temperature increase in operation.

Tests showed that, whereas with oil the lubricant temperature increased from 68 per cent to  $73\frac{1}{2}$  per cent in operation of room temperature, the increase in the temperature of kerosene under the same working conditions was

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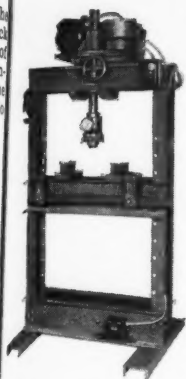
**LEMP**  
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**OLIV**  
1430 E.



## LEMPCO

**All Purpose  
Presses**

**Up to 60 tons  
Pressure**

**Built to  
"take it"**

Install a Lemeco Press in your shop today for pressing on arbors, setting dies or any one of the many jobs that call for a power or hydraulic press. There are different models, all of heavy I-beam and channel construction, priced to fit any shop. Write for catalogs giving all the details.

**LEMPCO PRODUCTS, INC.**

Dept. HP

**BEDFORD, OHIO**

## BALCRANK

Precision  
**MACHINE**



**HANDLES**

- ① MACHINED FROM SOLID BAR STEEL.
- ② SUPER SMOOTH POLISHED FINISH.
- ③ CLOSE TOLERANCE—ACCURATE BALANCE.
- ④ PRICED BELOW YOUR PRESENT COST.
- ⑤ COMPLETE STOCK ALWAYS AVAILABLE.
- ⑥ WRITE FOR CATALOG AND PRICES.

THE CINCINNATI BALL CRANK CO.  
CINCINNATI, OHIO U.S.A.

## AVOID COSTLY BREAKDOWNS

**Modernize . . . Install**

(DUE TO TOOL FAILURE)

Oliver Tool grinding equipment. Grind your DRILLS, CUTTERS, REAMERS, TAPS, etc., the Oliver way and SAVE.

You can—Increase Production.

Reduce Scrapped Parts.

Slash Grinding Costs.

Lower Idle Machine Time.

Cut Tool Costs.

Make **ACTUAL SAVINGS**  
that will soon pay the cost  
of Oliver Equipment.

Don't delay—write for details.

Let us Grind a few Drills for test—No obligation.

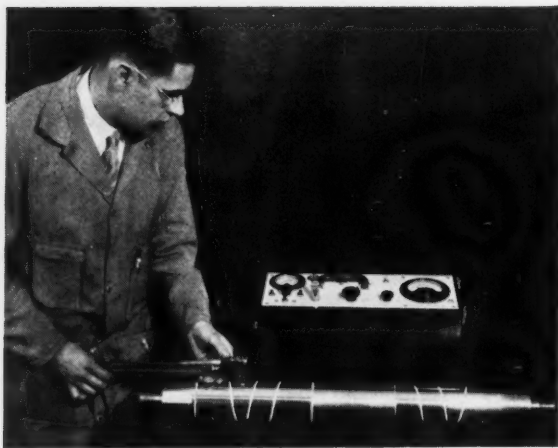


Model 510 Drill  
Grinder for  $\frac{1}{4}$  to  
3" drills. Auto-  
matic operation  
— Variable clear-  
ances — Variable  
point angles.

**OLIVER INSTRUMENT COMPANY**

1430 E. MAUMEE STREET

ADRIAN, MICHIGAN



Norton grinding machine spindles are given a mirror-like finish, accurate in size and straightness to 0.0001 in. and reading from 1 to 2 micro-inches (millionths of an inch) on the profilometer. The profilometer is shown here in use for inspecting the journals of a 10-in. Type C Norton wheel spindle.

only 9-4/10 per cent. It is said that an improved finish can also be obtained, at quicker speeds and with increased accuracy when kerosene is used as a lubricant. It has been found that the number of pieces per dressing can also be increased appreciably, which lowers the wheel cost per piece. Tests have also shown that, while maintaining the same production, spindle bearings wear less and fewer adjustments are required.

### Rochester Hydraulic Jack

The Rochester Machine Co., 134 Virginia Ave., Rochester, Pa., has devel-

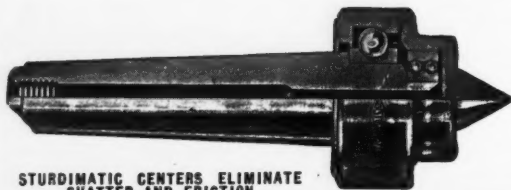
oped a light-weight, compact, easy-to-handle hydraulic jack, having a 50-ton rated capacity for use in locations too confined to admit a standard size jack. The flexible joint between the lifting cylinder and the two pressure cylinders is said to give the tool a very wide range of uses. Although the jack weighs only 46 lbs., it is claimed to be especially valuable for use in steel mills and factories when repairing cranes, locomotives, and so on, and in general for moving heavy machinery and other objects where access would be impossible for a larger jack of the same capacity.



Rochester Hydraulic Jack

To operate, the lifting cylinder is placed under the object to be lifted

## IT TURNS WITH THE WORK . . . .



STURDIMATIC CENTERS ELIMINATE CHATTER AND FRICTION

8 years continuous use has proved its value. Sturdy radial and thrust bearings insure rigidity and load capacity.

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# ARMSTRONG BROS.

Chrome - Vanadium SOCKETS  
Drop Forged RATCHETS



Drivers and Handles. Singly or in Sets. All Sizes with the ARMSTRONG DRIVE-LOCK feature — prevents sockets from falling off, prevents handles from loosening—the safe wrenches.

Write for New Catalog

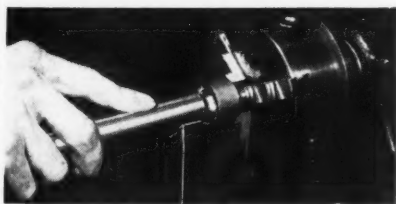
**Armstrong Bros. Tool Co.**

"The Tool Holder People"

328 N. Francisco Ave.  
CHICAGO, U. S. A.



## SEVERANCE TUBE BURRING CUTTERS ARE DESIGNED EXPRESSLY FOR THE JOB



Severance Tube Burring Cutters burr or chamfer tubing both inside and outside in one operation. In a shearing cut which forces the chips out and prevents loading, these cutters quickly and easily finish tubes in sizes from 1/16" O.D. and up. Submit your tube burring, reaming, chamfering and end sizing problems to our engineers or ask for Bulletin 12T.

**Severance Tool Manufacturing Co.**  
1516 East Genesee Ave. Saginaw, Mich.

# Less

**Time Out  
For  
Maintenance**

**Danger of Accidents**

**Chance For Breakdowns**

Get these advantages, apply



**SELF-LOCKING**

**Hollow Set Screws  
WITH THE KNURLED POINTS**

**wherever ordinary set-screws  
shake loose**

Once set up in the ordinary way, these screws will not shake, jar or vibrate loose, yet they can be easily removed for adjustments with the usual hex bar-wrench and re-used again and again. Usage in innumerable industries has proven our claims.

Write for samples and full details.



Fig. 1645



Fig. 1641

Pat.  
Applied  
for

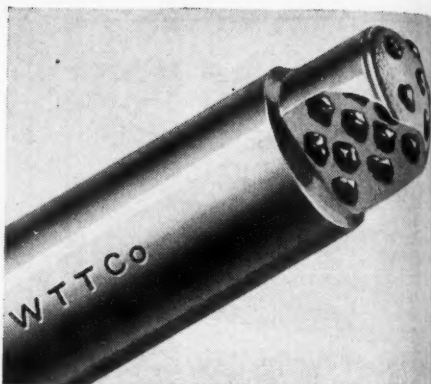
**STANDARD PRESSED STEEL CO.**

Branches	<b>JENKINTOWN, PA.</b>	Branches
Boston	BOX 556	Chicago
Detroit		St. Louis
Indianapolis		San Francisco

and the long barrel screwed in until the plunger contacts the object. The long screw is then propelled forward, thus lifting the object. To remove the jack, the long screw is released, causing the barrel and lifting plunger to return to original position.

## W.T.T.Co. Multiple Diamond Wheel Dresser

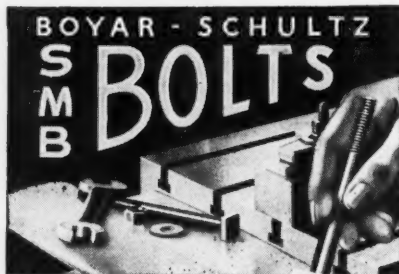
Wheel Trueing Tool Co., 13931 Oakland Ave., Detroit, Mich., is now marketing a multiple diamond wheel dresser consisting of a number of stones held together by matrix, in which the stones are regularly spaced so that the cutting is distributed among many active points. Each stone is said to be anchored solidly in the alloy by strong chemical bonds, and it is stated that these bonds will not break under heat, high pressure, or rough abuse in actual operating conditions. The matrix is hard enough to resist abrasion, yet wears away fast enough to maintain free cut-



W.T.T.Co. Multiple Diamond Wheel Dresser

ting and will not glaze or load the wheel.

The new dresser is designed primarily to cope with adverse dressing conditions. There are from 15 to 60 stones in a tool. The diamonds need no re-mounting as they are completely consumed in dressing. Standard dressing tools include diamond weights from one



### SPECIAL T-SLOT MACHINE BOLTS

"Chrome Moly" Steel—Heat Treated. For Milling Machines, Planers and Other Tools

**SAVE THE MACHINE** S-M-B Bolts preserve the machine bed. Cheap bolts, with uneven heads may ruin beds on costly machines by developing warp-age.

**SAVE THE JOB** S-M-B Bolts permit delicate, firm adjustments that hold throughout the job under the heaviest machine cuts.

**SAVE TIME** With S-M-B Bolts that are always accurate and always at hand in our Special S-M-B Bolt Racks.

Write for Bolt Bulletin

**BOYAR-SCHULTZ CORPORATION**  
2118 Walnut Street • Chicago, Illinois

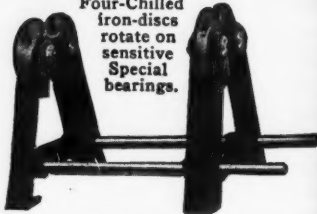
### Improved Anderson Balancing Ways No Leveling Required

A simple and excellent device for balancing, straightening and trueing.

They are made in the following sizes:

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

Four-Chilled iron-discs rotate on sensitive Special bearings.



Write for Full Information

Made by **Anderson Bros. Mfg. Co.**  
1926 Kiewit Ave. St. Rockford, Ill.

## The IMPROVED M-B "Super-Speed" Air Grinder

Thrilling  
Speeds



Amazing  
Power

• Steel construction throughout... Positive quick-acting air control valve. Operates on air pressure of 40-100 pounds. The only hand grinder with spindle speed of 100,000 R.P.M. on 100 pounds air pressure.

• Also other models and air line filters and automatic air line lubricators.

Write for details.

### M-B PRODUCTS

130 E. LARNED ST. DETROIT, MICH.

Export Office:

44 Whitehall St., New York, N. Y., U. S. A.

## LUFKIN COMBINATION SET

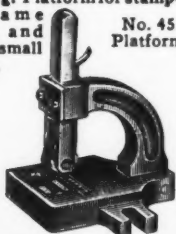


## Mark It Quickly with a NUMBERALL



Made with 1 to 10 wheels. Stamp in perfect alignment. Shank for Hand or Press Stamping. Platform for stamping Name Plates and other small articles.

No. 45  
Platform



NEW Quick Set Machine. One wheel can be turned quickly by knurled knob for consecutive numbering.

NUMBERALL STAMP  
& TOOL CO.

Huguenot Park,  
Staten Island, N. Y.

Because it handles so nicely, because you get such accurate, dependable results with so little effort, and because it gives such long service, the Lufkin Combination Set is frequently called the "indispensable" tool. You'll agree when you use one! See it at your dealers and write for Precision Tool Catalog No. 7.

## LUFKIN

SAGINAW, MICHIGAN • New York City

to three and one-half carats, depending on the size and hardness of the wheels to be dressed. Three different sizes of stones are listed to provide for variations in the grain of the wheel.

### Dayton Rogers Model "C" Pneumatic Die Cushion

A tandem model pneumatic die cushion has been added to the regular line of die cushions manufactured by the Dayton Rogers Mfg. Co., 2830 S. 13th

Ave., Minneapolis, Minn. The Model "C" pneumatic die cushion is designed primarily for use on power drawing presses where tandem die cushioning means are necessary, making it possible to double or triple the ring-holding pressure when the press bed opening is lim-

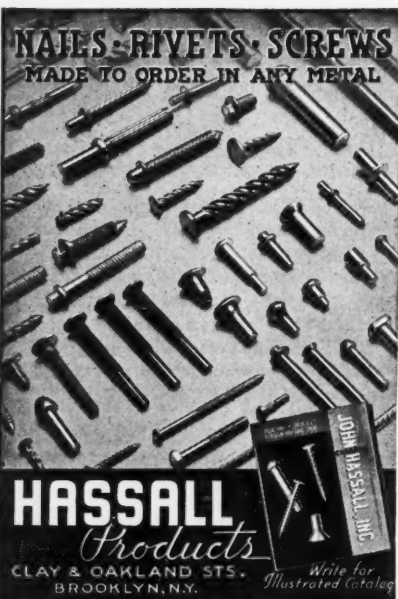
## CENTERLESS GRINDING

*Accuracy—Prompt Service*

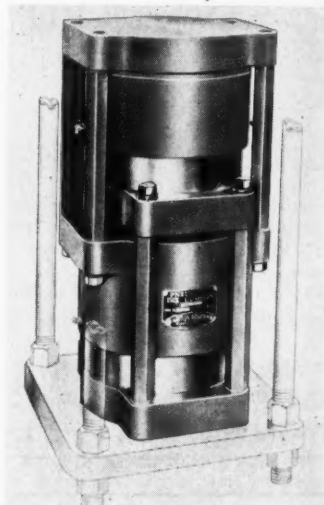
### Commercial Centerless Grinding Co.

6538 Carnegie Ave., Cleveland

**NAILES · RIVETS · SCREWS**  
MADE TO ORDER IN ANY METAL



**HASSALL**  
*Products*  
CLAY & OAKLAND STS.  
BROOKLYN, N.Y.



Dayton Rogers Model "C" Pneumatic  
Die Cushion

ited. The Model "C" die cushion is made in five sizes having piston diameters from 10 to 18 in., and can be furnished in single, double or triple units with press mountings, as shown in the illustration.

### Leiman Grinding and Polishing Dust Collector

A small unit dust collector announced by Leiman Bros., 4W-23 Walker St. New York, N. Y., is electrically driven from a wall receptacle or lamp socket. It need not necessarily occupy any floor space whatsoever as it has fixtures for fastening to the wall or ceiling or any post or column in the shop. Legs are provided, however, for floor location as well.

The unit is a neat and compact dust collector for sucking away and holding the dust from any dust-creating device

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## For a THOROUGH Stamping Job



You get clear, uniform marks for a long time—from THOR STAMPS.

They're made of correctly-heated alloy steel with thumb side marking for easy use. Central striking point prevents uneven marks. Write for catalog and prices.

**The Pittsburgh Stamp Co.**

812 CANAL ST.

PITTSBURGH, PA.

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## Standardized JIG BUSHINGS

Acme Standard  
over 6700 Items

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over 4200 Items

Acme Drill Jig Bushings are made by the most exacting, scientific methods—insuring long wear, accurate fit, and absolute satisfaction. A standardized product, carried in stock for prompt delivery in over 10,900 standard items—all completely finished and ready for use. Special sizes made to order.

SEND for BULLETIN  
CONTAINING COMPLETE  
DATA and LOW PRICES

**Acme INDUSTRIAL CO.**  
212 N. Laflin St. Chicago, Ill.

# A REAL MONEY SAVER!

## MARQUETTE A.C. ARC WELDER



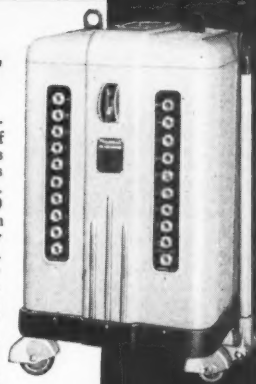
### Model 400 BT

is a high speed heavy duty continuous production welder capable of handling from  $\frac{1}{16}$ " to  $\frac{1}{4}$ " electrodes inclusive and has 19 heat stages ranging from 30 to 350 amperes. Standard voltages are 220 and 440 volts. Other voltages available on

special order. Built for use on production lines and heavy duty welding, the 400 B T is a real money saver at only \$498. A. C. welding is by far the best and cheapest method of joining together metal parts. The alternating current automatically and continuously reverses its polarity, thus puddling the molten metal and floating the impurities to the top where they form a slag. The resultant weld is strong, dense and ductile. There are four other Marquette A. C. Arc Welders: 100 B, 20 to 150 amps at \$155; 200 B, 20 to 200 amps at \$195; 300 B, 20 to 250 amps at \$225; and 300 B T, 20 to 250 amps at \$242.50. Listed by Underwriters' Laboratories Inc.

For complete details write  
Dept. E

**MARQUETTE**  
**MANUFACTURING CO., Inc., Minneapolis, Minn.**



MODEL 400 BT

August, 1939

MODERN MACHINE SHOP 151

or machine, including grinding and buffing wheels, saws, routers, surface grinders, sand paper wheels, sanding belts, moving carriages on lathes, and for similar uses. The collector may be located at or near the machine from which the dust is to be sucked and no outside connections such as exhaust pipe outlets are required.

The outfit is quiet in operation and has a powerful suction. The dust disposal cyclone tank has a high grade vacuum cloth straining bag over it to keep the dust in and to let the air out. This bag, by its collapsing action

as the machine stops, is partially self-cleaning and the cleanout receptacle at the bottom of the cyclone need only



**PRECISION**  
*Years*

5/8" to 16"

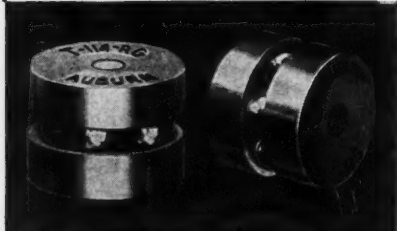
ANY MATERIAL

30 YEARS EXPERIENCE

**DETROIT BEVEL GEAR CO.**

8130 Jos. Campau Ave., Detroit, Michigan

## FOR SEVERE SPINDLE END THRUST

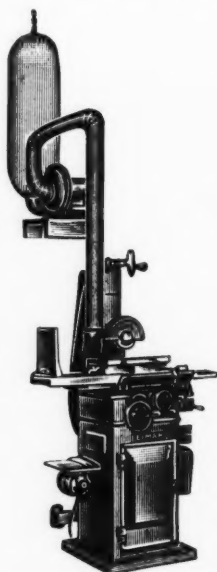


Heavy race sections and deep grooves give this Auburn Bearing unusual capacity and life. Easily installed—requires a minimum of machine work for its use.

Write for complete catalog listing stock sizes and load ratings.

**AUBURN BALL BEARING CO.**

69 CLARISSA ST., ROCHESTER, N. Y.



Leiman Grinding and Polishing Dust Collector

be emptied as often as the amount of dust accumulated should necessitate.

## Ahlberg Sound-Insulated Ball Bearing Pillow Block

To meet the demand for noiseless anti-friction efficiency on many applications where the cost of ball bearings has heretofore been prohibitive, the Ahlberg Bearing Company, 3029 W. 47th St., Chicago, Ill., is now offering the ED-R Series Pillow Blocks.

The units are designed for light duty. They are low in cost, but are nevertheless substantially constructed to meet the needs of light service on many types of equipment, such as domestic air-conditioning units, attic fans, and so on, where quiet operation is desirable. The precision CJB bearing in the ED-R Pillow Block is completely insulated from the metal housing by a molded cushion of Neoprene, a synthetic rubber which is impervious to oil and



## BUY ECONOMY

**HOLLOW  
SET  
SCREWS**



**SOCKET  
HEAD CAP  
SCREWS**



*Try Them On Your Next Job!  
Or Write For Samples Today.*

**ECONOMY  
MACHINE PRODUCTS  
COMPANY**

5216 Lawrence Ave., Chicago, Ill.



Users of KENNAMETAL-tipped tools are finding profits in time saved in machining, annealing, tool grinding, and buffing on finished pieces. The reason: KENNAMETAL machines steel heat-treated up to 550 Brinell, at higher speeds, with more pieces per grind and producing a smoother, more accurate finish.

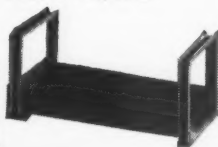
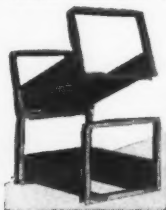
Begin today to earn extra dividends for your shop by using KENNAMETAL-tipped tools. Write for catalogue—also new Lathe Speed Chart and special Grinding Instructions.



## HIGH-PILED BOXES HANDLE LIKE DRAWERS

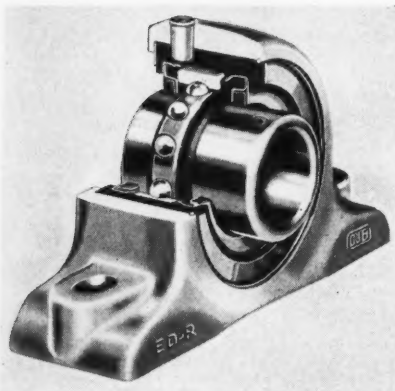
Heavy stock boxes and tote pans slide in patented STACKRACKS as easily as drawers in a desk. Pile your boxes as high as you wish—you can get at the contents of any one without moving any other. Instantly accessible box storage means faster handling of parts and materials—means more productive work hours per day. You can profit by the use of

**STACKRACKS**—individual steel units which interlock to form storage racks of any size, shape or capacity. Write to Stackbin Corp., 53 Troy St., Providence, R. I.



**STACKRACKS**

"STACKED AND STILL ACCESSIBLE"

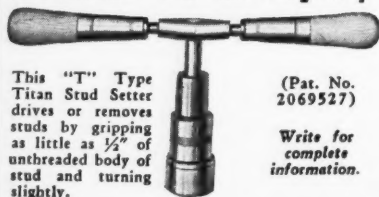


Ahlberg ED-R Series Pillow Block

grease. This construction effectively damps noise and vibration.

The seals, also of Neoprene, are of a floating construction which eliminates friction and gives both seals and bearings longer life. Ample provision is made for normal misalignment. The bearing is electrically grounded. The

### SET STUDS "The Roll Grip Way"



This "T" Type Titan Stud Setter drives or removes studs by gripping as little as  $\frac{1}{2}$ " of unthreaded body of stud and turning slightly.

(Pat. No. 2069527)

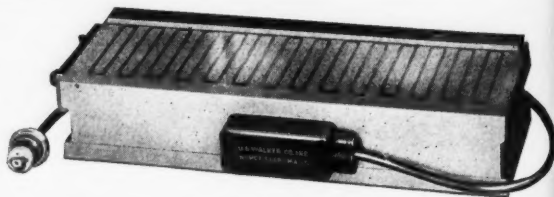
Write for complete information.

**Titan Tool Co., Fairview, Pa.**

### SET-UP TIME Becomes PRODUCTION TIME

Walker Magnetic Chucks save from 20% to 50% in chucking labor by eliminating slow-acting jigs and fixtures for metal removing operations on lathes, shapers, drills, presses, planers, grinders, etc. Write for Catalog W 3.

**O. S. WALKER CO., Inc.**  
Worcester • Mass.



No. 618 Bar Pole Face Rectangular Magnetic Chuck  
Available in sizes 4x8 to 30x96.

housings are solid die castings, compact and clean-lined. Shaft sizes are  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ ,  $1\frac{1}{2}$ , and 1 inch.

### "Surfaceweld A"

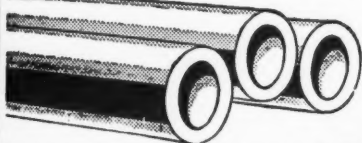
A hard surfacing powder for application with the carbon arc has been made available by The Lincoln Electric Company, Cleveland, Ohio. Known as "Surfaceweld A," the new product is a fine grained alloyed powder for application with the carbon arc and which is said to produce a smooth, dense, hard and abrasion-resistant surface.

When properly applied, the material is said to provide a coating with a hardness of approximately Rockwell 54C. This hardness will vary somewhat, depending upon the amount of admixture with the base metal to which it is applied. It should be noted, however, that hardness has little relation to abrasion resistance. The alloy develops full hardness in deposition, maintains its hardness at high temperatures, and resists scaling also at high temperatures. The deposit is not softened by annealing. Corrosion resistance is said to compare favorably with that of stainless steel.

One of the advantages is that Surfaceweld A can be applied in very thin and extremely smooth layers. A deposit as thin as 0.025 in. can be applied to light metals.

In use, the powder is spread evenly over the area to be surfaced and to a depth of two to three times the desired thickness of deposit. Using a sharp, well-tapered carbon with negative polarity, the powder is fused with a weaving motion, the exact heat required depending on the size of the work. "Surfaceweld A" is shipped in 1 lb. and 15 lb. cans.

## BISCO TOOL STEEL TUBING



Don't waste time and money in drilling from the solid . . . Order BISCO TOOL STEEL TUBING.

Prompt shipments from stock in sizes up to 14" diameter and 2" wall thickness. Other sizes to your specifications. Investigate and save!

We also supply: Stainless Tubes, Aircraft Tubes, Mechanical Tubes, Pressure Tubes and Ball Bearing Tubes. Cold Finished Steels. Tool Steels.

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**THE BISSETT STEEL CO.**

943 East 67th St. • Cleveland, Ohio

## "GUSHER"

PORTABLE  
PUMPING  
UNITS



with or without heavy duty casters

For the machines in your shop not originally equipped with pumps or reservoirs. All that is needed is a distribution and return line to make the installation. Unit No. 1 (above) holds 4 gallons of coolant. A larger Unit No. 2 holds 11 gallons.

Although usually equipped with the UL model pump shown here, any "GUSHER" immersion type pump may be used.

You can't go wrong on simple and efficient "GUSHER" Pumps. Write today for catalog.

**The Ruthman Machinery Co.**

538 E. FRONT ST. CINCINNATI, O.

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Produces the Sellers

"Profit Point"—

recommended by

Leading Drill

Manufacturers—

the point that

cuts faster, drills

more holes per

grind, saves time,

lowers drill

costs as much

as 90%.

Model shown

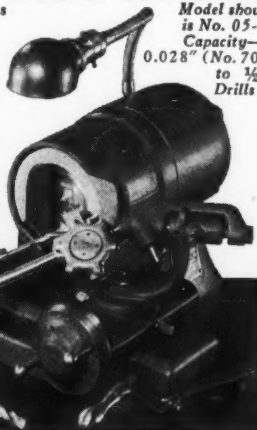
is No. 05-D

Capacity—

0.028" (No. 70)

to 1/2"

Drills



Write for catalog  
and prices.

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SELLERS  
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# Sellers

## South Bend All-Steel Welded Bench

An all-steel welded bench designed to provide a suitable support for South Bend Precision Bench Lathes has been



South Bend All-Steel Welded Bench

developed by South Bend Lathe Works, 977 E. Madison St., South Bend, Ind. Extreme rigidity, the most essential feature for a bench of this type, has been obtained by scientific bracing and generous proportions of all parts.

Smooth, flowing lines with rounded corners show a modernistic trend toward streamlined shop equipment that

is not only pleasing to the eye, but also highly practical. There are no sharp corners in which dirt or chips might collect and no angular projections to form a hazard to the workman.

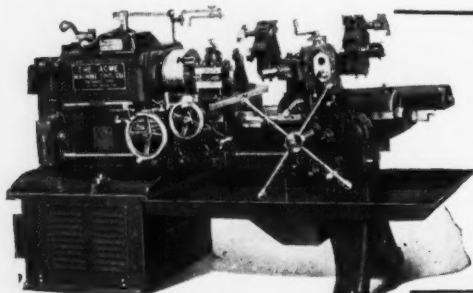
Around the top of the bench is a deep rolled rim which serves as a chip pan or oil pan. The sides and back of the bench are enclosed in smooth panels securely welded to the frame work. The front is open to permit the operator to take a comfortable working position either sitting or standing. The entire bench is finished in standard machine tool gray.

The lathe motor drive equipment is located in the left side of the bench, while in the right side are three large drawers for storage of chucks, tools, and accessories. Each drawer has an individual tumbler lock uniquely combined with a latch and knob.

It is claimed that the bench, being built entirely of metal with securely welded joints, will not sag, swell or warp, or otherwise be affected by climatic conditions, as the parts in a wood bench. The absence of bolts, screws, and similar fastenings eliminates the possibility of joints becoming loose.

## Howell Explosion-Proof Motor

The Howell Electric Motors Co., Dept. O, Howell, Mich., announces an extension to its line of Types EKBB (poly-phase) and EKCI (single phase) explosion-proof motors up to 40 h.p. These motors were formerly built in sizes



## Cincinnati Acme Universal Turret Lathes

The No. 4W Acme Universal Turret Lathe with its unusual high operating efficiency and simplified design, insures maximum production on all work within range. Write for circular.

**THE ACME MACHINE TOOL COMPANY**  
CINCINNATI • OHIO

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297 E.

15"



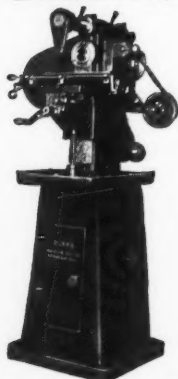
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August,

## BURKE Milling Machines



Burke motor driven milling machines. Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

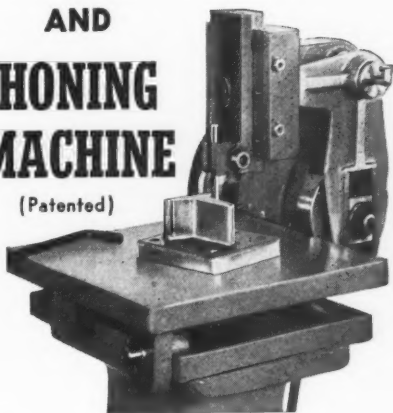
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**BURKE MACHINE TOOL CO.**  
297 E. 16TH ST. CONNEAUT, OHIO



## FILING AND HONING MACHINE

(Patented)



*Sturdy, Fast, Accurate*

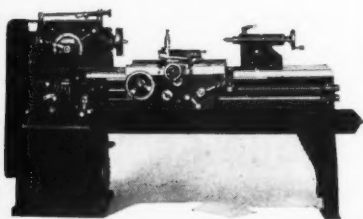
Machine finish your punches.  
Eliminate the slow, tedious hand method.

Guaranteed to cut your cost.  
Price and description on request.

**BRICKNER-KROPF**  
MACHINE COMPANY, Inc.  
MUSKEGON • MICHIGAN

*New*  
**"C & J"**

**15" and 16" Lathes**

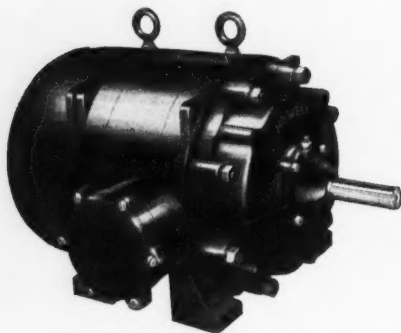


12 Speed Geared Head-Motor Drive  
Timken mounted spindle  
Modern Design—Liberal Dimensions  
*Write for bulletin.*

**The Carroll & Jamieson Machine Tool Co.**  
BATAVIA • OHIO, U. S. A.

-ranging from  $\frac{1}{4}$  to 10 horsepower.

Howell totally enclosed, explosion-proof motors are specially built for operation in locations where inflammable liquids or gases are manufactured,



Howell Explosion-Proof Motor

handled or stored, such as in paint factories, chemical plants, refineries, dry cleaning plants, body plants, finishing plants, and so on. The illustration shows a Howell explosion-proof motor

with a totally enclosed, fan-cooled frame. All of these motors carry the Underwriters' Inspection Label and are approved for all Class 1, Group D Locations.

It is stated that tests have proved that the special Howell design will withstand the explosion of an inflammable substance inside the motor and will prevent the flames produced by such an explosion from reaching the surrounding atmosphere; also, that the Howell heat capacity is great enough to prevent the motor, even under abnormal conditions, from reaching a temperature high enough to ignite surrounding gases.

### Rego KX Cutting Torch

Bastian-Blessing Company, 244 E. Ontario St., Chicago, Ill., has brought out a cutting torch especially designed for speed and economy in tough cutting operations such as hole punching, cutting rusty multiple plates, desaming billets, and so on. The torch, which is to be known as the Rego KX, has the following characteristics:

Stainless steel head which is said to



Rego KX Cutting Torch

withstand terrific heat without distortion, thus eliminating stripped threads; stainless steel tubes in triangular construction with welded spacer, providing maximum strength and added rigidity; high pressure valve with diaphragm which eliminates customary packing and assures leakproof operation, also with long handle which provides maxi-

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WE DO Surface Grinding, Internal and External Grinding, Lapping, Splining and Broaching.

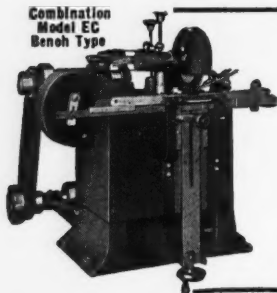
We specialize in grinding hardened steel bushings, cam rollers, etc.

25 years spent in serving the machine trade guarantees quality work and prompt service.

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1919 E. 61st Street Cleveland, Ohio

Combination  
Model EC  
Bench Type



## SHARPEN YOUR OWN SAWS

**SAVE OVER 80% ON SHARPENING  
HACK, BAND, CIRCULAR SAWS**

The WARDWELL SAV-A-SAW automatically sharpens saws with teeth as fine as 32 to the inch at a speed up to 75 per minute. Savings on 2 gross of blades will pay for the machine. Assures keener cutting saws at extremely low cost.

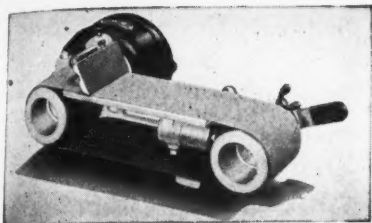
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**THE WARDWELL MFG. CO.**

3166 FULTON RD.

CLEVELAND, OHIO





## •NEW ABRASIVE BAND GRINDER..

*"Built Like a Machine Tool"*

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout. Equipped with ALEMITE LUBRICATION complete with grease gun.

*Write for illustrated folder on this and other styles and sizes.*

**HORMEL-M GRINDER**

WALLS SALES CORP.

96 WARREN ST. NEW YORK, N. Y.

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**DAVIS KEYSEATER**

**will do the job so much quicker and better?**

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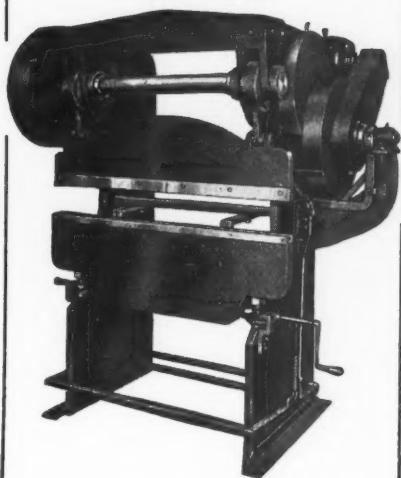


**DAVIS KEYSEATER CO.**

Exchange and Glasgow Sts.  
ROCHESTER, N. Y.

## CHICAGO STEEL PRESS

No. 253



**does 40% to 60% of the forming work turned out by the average shop.**

Here's a profitable, economical brake ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, and a great variety of sheet metal specialties. Its variable speed drive operates from 17 to 50 strokes per minute. The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials.

Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

*Write for Circular No. 253*

**DREIS & KRUMP MFG. Company**

7418 LOOMIS BLVD.

CHICAGO

ILLINOIS

mum leverage and sensitive control; forged brass body incorporating shut-off valves with large easy-grip wheel handles, and solid drawn copper tips providing ideal gas mixture with fast preheat for operation under tough conditions.

The torch is available in either 19 or 26-in. length and with 75 or 90 deg. head angle. The operator also has the choice of two positions of high pressure valve levers—bottom and side—and three complete series of tips, each with the correct varying amount of preheat hole area.

### GRAY TURRET HEAD METAL CUTTER OR NIBBLER



Cuts all metals any shape—  
30 gauge up to 1".

GRAY, Originator of  
First Practical Metal  
Cutter or Nibbler.  
**GRAY Cutters  
Still Lead.**

**GRAY MACHINE CO.**  
Dept. A P. O. Box 596  
Philadelphia, Pa.

### IT'S NEW

#### No. 608 Abrasive Belt Polisher

A real production machine.

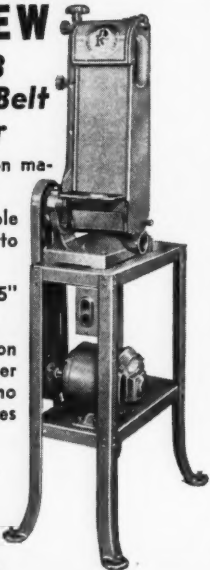
Quickly adjustable  
from vertical to  
horizontal.

Work table 15"  
long by 6" wide.

Exhaust connection  
for vacuum cleaner  
bag. No dust—no  
dirt. Other sizes  
and types.

Write for folder.

**PRODUCTION  
MACHINE CO.**  
Greenfield, Mass.



### Sellstrom Dependon Safety Shield

The latest contribution of Sellstrom Manufacturing Co., 645 N. Aberdeen St., Chicago, Ill., to industrial safety as it applies to eyes and face is a device



Sellstrom Dependon Safety Shield

known as the "Dependon Safety Shield," illustrated herewith. The window material, which is synthetic, will stand heat, sparks, and acids, and sets out away from the face far enough to allow perfect ventilation as well as the wearing of glasses or goggles. The window material is available either clear or tinted and can be had in various depths from forehead to chin.

An outstanding feature is the headband which is not only comfortable but which can instantly be adjusted to fit any cranium. The window is attached to the headband by friction swivel joints which enable the wearer to raise the window entirely out of the way, above his head, without interfering with spectacles or goggles. The shield is particularly recommended for use on grinding and chipping operations work with acids or hot liquids, plating, and for welding operators.

### Ultra-Chex Precision Measuring Standards

George Scherr Company, Inc., 110 Lafayette St., New York, N. Y., has placed on the market a set of precision measuring standards under the trade

name of "Ultra-Chex." The set consists of nine standards accurate to 8 millionths of an inch, and will make 71 combinations in steps of  $\frac{1}{16}$  in. up



Ultra-Chex Precision Measuring Standards

to  $4\frac{1}{4}$  in. and 41 combinations in steps of 0.100 in. up to 4.1 inches.

Also available with the Ultra-Chex set is the Scherr Optical Parallel, accurate in planeness within 4 millionths. This instrument is used to check the parallelism of micrometer anvils by observing light interference bands on both anvils.

The Ultra-Chex set is said to be particularly useful in toolmaking and general shop work for such operations as checking lead accuracy in micrometers, inspecting and setting micrometers, setting height gages and adjustable snap gages, and setting and inspecting measuring machines and machine tools.

### Type SME Straight-In-Line Ratiomotor

The Boston Gear Works, Inc., North Quincy, Mass., has added to its line of Reducers and Ratiomotors (speed reducers and motorized speed reducers) the Type SME Straight-In-Line Ratiomotor illustrated herewith. A complete reducing unit in itself, the Type SME Ratiomotor is suitable for many applications where a high speed motor cannot be used. Motors used in the Ratiomotor are all 1,800 r.p.m., but the output speeds are based on full load motor speed of 1,725 r.p.m. Output speeds are 108, 144, 172, 230, and 276 and are available for either  $\frac{1}{2}$  or  $\frac{3}{4}$  h.p. motors. All motors are A.C., 60 cycle, 1,800 r.p.m., and are available for 110, 220, or 440 volts.

Equipped with  $\frac{1}{2}$  h.p. motor, the Type

Is there a

PRIMA DONNA



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Ordinary Diamond Dressers  
Need Special Care But The  
CARBOLOY Dresser Can "Take It"

Carboly Dressers stand abuse because they don't depend on one diamond. Instead, they have a multitude of sharp, diamond cutting points permanently held in a special matrix. To get a new cutting surface just give the dresser a quarter turn in its holder. No remountings! No worries! Lower cost! Send for catalog DR-38.

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Catalog  
DR-38

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DIAMOND IMPREGNATED WHEEL DRESSERS

Clean,

SHARPLY DEFINED

Scribed Lines

SECURED QUICKLY, EASILY  
AND ECONOMICALLY WITH

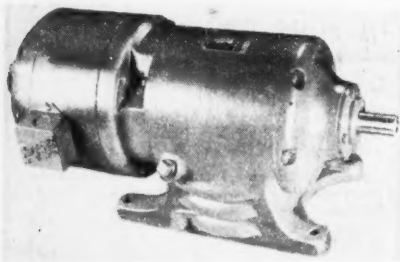
Micro  
Supreme  
LAY-OUT DYE

TRIAL OFFER: A handy five-ounce Combination  
Brush-In-Can... ideal for shop use and for  
trial purposes... for only 40¢

MICHIGAN CHROME CO.

6346 E. JEFFERSON AVE., DETROIT, MICH.

SME has an output h.p. of 13. Equipped with a  $\frac{3}{4}$  h.p. motor, the output is  $\frac{3}{4}$  h.p. Output torque for  $\frac{1}{2}$  h.p. motor ranges from 97 to 248 inch-pounds; for  $\frac{3}{4}$  h.p. motor, output torque ranges



Type SME Straight-In-Line Ratiomotor

from 142 to 362 inch-pounds.

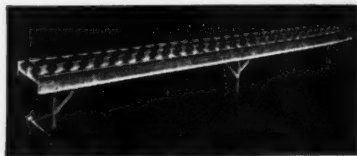
All gears are of high carbon heat treated steel, cut after heat treatment to eliminate possible distortion in heat treating. The double reduction drive of the Type SME permits the unit to be disassembled, if necessary, into three unit parts for purposes of inspection

or installation. All shafts run in precision anti-friction bearings which adequately take care of all radial and thrust loads and make the Type SME an extremely quiet and smooth-running unit.

## Portable Aluminum Conveyor

A roller-type portable conveyor made of 61 S. T. Alcoa Aluminum, featuring high tensile strength combined with light weight, has been placed upon the market by the Aluminum Ladder Co., 138 Adams St., Tarentum, Pa. The model illustrated is equipped with steel ball bearing wheels fitted on an eccentric axle at each end of the conveyor. When the wheels are in a "down" position, the conveyor is easily rolled from place to place; when they are lifted up, the conveyor rests firmly on the floor. Due to the light weight of aluminum, only one or two people are needed to change the location of the conveyor.

It is claimed that the rugged con-



Portable Aluminum Conveyor

struction and high tensile strength of the conveyor enable it to support extremely heavy loads. It will not rust or deteriorate and, therefore, will withstand years of severe service.

The conveyor can be supplied with or without legs, and with or without wheels on the legs. The model shown

## FASTER ASSEMBLY

with Binrack Assembly Equipment  
TIME and MOTION SAVER

1. Parts are condensed.
2. Gravity Feed.
3. Tilt-Type Bins.
4. Interchangeable Bins—Complete Flexibility.

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GORDON HALL CO.  
LYNN, CONN.

# "OUTWEARS

the best

# Bronze Metal"

## ARGUTO OILLESS BEARING CO

Wayne Junction, Philadelphia, Pa.

20 years

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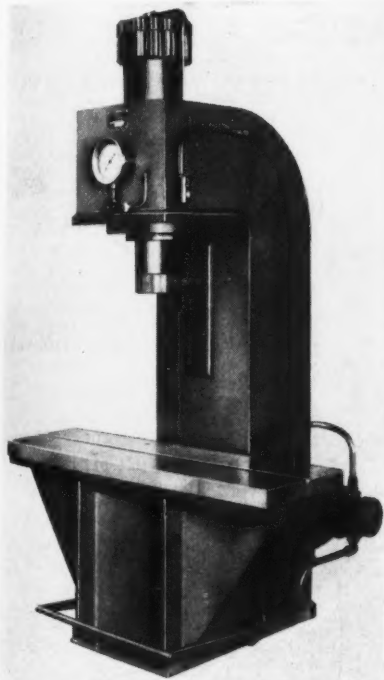
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August

is 10 ft. long, 14 in. wide, and weighs only 60 lbs. The various types are available in varying widths, lengths, and heights to suit different needs.

## Denison 25-Ton Hydraulic Press

To meet the requirements of manufacturers who use small capacity presses for straightening, assembling,



Denison 25-Ton Hydraulic Press

and broaching, the 25-ton hydraulic press shown in the illustration has been developed by the Denison Engineering Company, Chestnut and Water Sts., Columbus, Ohio. Though built especially for straightening work, it is similar in many respects to the line of standard and special presses in various sizes built by this company.

The power unit is mounted as an integral part of the fabricated steel frame and consists of a 15 h.p. motor with hydraulic pumps of proper sizes

45% DRILL COST  
SAVING!

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NEW  
"feed-as-you-need"  
CHUCK

**GIVEN DEPTHS**  
Diagrams illustrate  
"Feed-as-you-need"  
combinations for ex-  
acting depth require-  
ments.

The outstanding tool design development of two decades. Use straight shank drills (whole or broken) — Use entire drill or any part of it for given depths — use for single or multiple operations.

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without delay.

**Scully-Jones & Company**  
STANDARD and SPECIAL PRODUCTION TOOLS  
1913 S. ROCKWELL STREET, CHICAGO

to effect a down speed of the ram of approximately 24 in. per minute and is capable of effecting a 25-ton load at any point of the complete length of the stroke. The total stroke of the press is 18 inches.

The control mechanism of one reversing four-way operating valve is connected by linkage to a special pressure control valve which is operated by the control lever located at the front of the press. The motor control push button is conveniently located on the side of the press frame.

In the cycle of operation full control is maintained through the use of a bar-type foot-operated pedal. Infinite tonnage variations up to the capacity of the press may be had by simply applying slightly greater pressures of the pedal. At any time that reversal is required it is only necessary to release the pedal and the ram will raise at approximately 48 in. per minute. Length of the reversal stroke may be decreased by an adjustable stop, which also acts as an unloading valve control. At the top of the reverse stroke the pumps are unloaded to the oil reservoir at 0 lbs. pressure; thus by dropping the working pressure, a substantial saving in electrical energy is ef-

fect. Mounted directly in front, over the open throat of the press, is a 6-in. diameter dial pressure gage graduated both in pounds per square inch and tonnage.

## Colonial "Pull-Down" Broaching Machine

A pull-down type of broaching machine which provides extreme simplicity of loading and unloading, while at the same time eliminating both manual and automatic broach handling for internal broaching, has been developed by Colonial Broach Company, 147 Jos. Campau, Detroit, Michigan.

The machine was developed primarily for broaching keyways in the taper holes of steering wheel hubs, two such hubs being broached at one time. In this machine, the broach is pulled down through the work. When the broach reaches the bottom of the stroke, the ram trips a release which causes the work-holding cradle to lift up under spring pressure at an angle away from the broach. The work may then be removed without interference with the broach, and the work-holding cradle reloaded—all while the broach is in the "down" position (in the base of the machine). The ram then returns to the top of the stroke, the broach passing through the work but clearing the work surfaces due to the angle offset of the raised fixture.

With the broach at the top, the work-holding cradle is lowered manually against spring pressure, locating the parts over a keyway horn which also serves as a guide for the broach. The cradle is automatically locked in this position when lowered, and remains there until released again at the end of the next work-stroke.

To start the broach down on the cutting stroke the operator must place

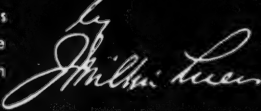


PRESSES  
FEEDS  
AUTOMATIC  
EQUIPMENT

THE V & O Press Co., Inc.  
HUDSON N. Y.

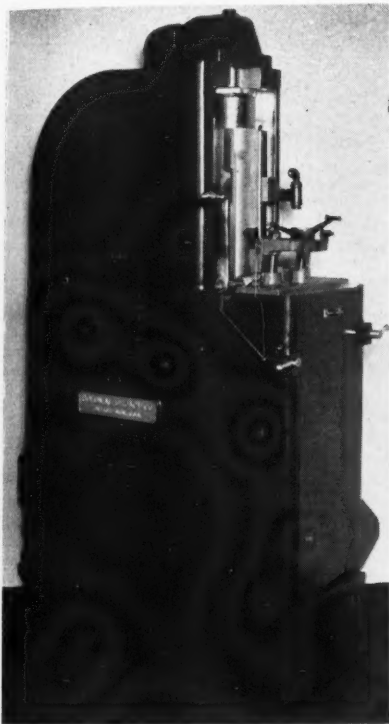
# Are we using Cutting Off Tools

J. Milton Luers  
8790 Grinnell Avenue  
Detroit • Michigan





both hands on the dual safety controls. Standard stroke of the machine is 24 in., but the stroke is adjustable by means of trip dogs mounted in a T-slot in the right hand front face of the machine. The left hand face carries the cam for automatically operating the trip releasing the cradle when the broach has completed the work stroke.



Colonial "Pull-Down" Broaching Machine

With this arrangement the usual automatic or semi-automatic broach pullers for releasing and re-engaging broaches are eliminated, the broach always staying in the puller. The machine has a cutting speed of 30 ft. per minute on the down stroke, and a high speed return of 60 ft. per minute. It is rated at four tons capacity. The main drive motor is built into the frame for streamlined compactness.

A separate coolant motor and pump are located in the base of the machine.



## ANSWERS *All* TOOL STORAGE PROBLEMS

● Here's an unusual book that will help purchasing agents, shop superintendents and toolroom attendants save time and money. It shows the most complete line of modern tool storage equipment available . . . but it's much more than a catalog. It pictures the most up-to-the-minute applications of this equipment . . . describes the uses of each unit for different types and classes of tools . . . shows the latest shop-proved methods for providing useable, accessible storage that reduces tool handling costs and saves floor space. Included also are space- and money-saving suggestions on shop equipment, enclosure panels, die and bar storage. Mail coupon today for free copy.

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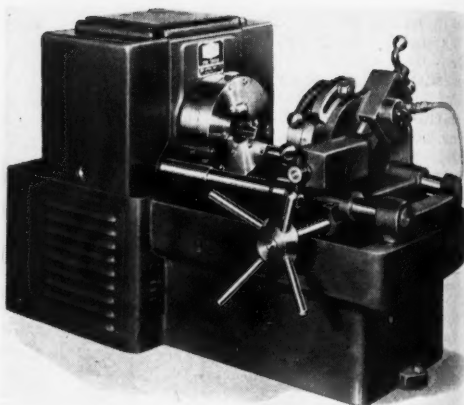
City \_\_\_\_\_ State \_\_\_\_\_

Operation of the machine proper is hydraulic, a 1,000-lb. pressure constant delivery pump being used for actuating the broach ram, through the ram cylinder.

## Oster No. 562 "Tom Thumb" Portable Pipe Machine

The Oster Manufacturing Co., Cleveland, Ohio, has announced an improved model of the "Tom Thumb" Portable Pipe Machine. Having a capacity covering all sizes of pipe from  $\frac{1}{2}$  to 2 in. inclusive, through its spindle, the "Tom Thumb" Pipe Machine, designated as the No. 562, is also capable of driving geared diestocks up to 8-in. capacity through a special, universal shaft.

Of strictly modern design, the No. 562 uses a ball bearing mounted spindle. The worm drive and all shafts are mounted in ball bearings. Its general construction consists of a welded steel base and guards which give it maxi-

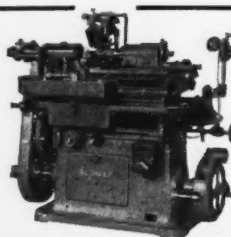


Oster No. 562 "Tom Thumb" Portable Pipe Machine

mum strength with minimum weight. The No. 562 is powered by a  $\frac{1}{2}$  h.p. Black & Decker, universal, reversible, variable speed motor and the drive from motor to machine is through V-belts.

A new type of die head which is integral with its carriage is used for greater rigidity and support for the high speed steel threading dies. This method makes for longer die-life and more accurate work. The die head is of the front cutting type which, together with the machine's "close-grip" front chuck, permits lengths as short as  $2\frac{1}{2}$  in. to be threaded without the use of a nipple chuck. The size setting marks are on top of the die head where they are plainly visible for easier, more accurate settings. The ways on which the head is mounted are  $1\frac{1}{4}$ -in. solid steel studs, supported at both ends for perfect alignment.

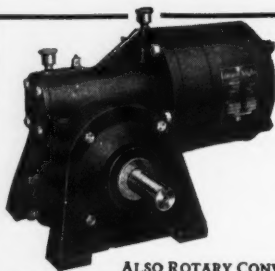
An internal oiling system to the dies



## BECHLER AUTOMATIC SCREW MACHINES

Give  
Fastest Speeds  
Unusual Precision  
Simple Set Ups  
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TRIPLEX MACHINE TOOL CORP.  
131 BARCLAY ST. NEW YORK CITY



ALSO ROTARY CONVERTERS—  
BLOWER WHEELS—MOTOR GENERATORS

## Janette Speed Reducers

43 SIZES FROM  $1/50$  TO  $7\frac{1}{2}$  H.P.

The diversity of the Janette line of speed reducers enables us to supply a machine for almost any purpose. You can select the style of compact, rugged reducer to meet your individual requirements.

Bulletins and recommendations on request.

**Janette Manufacturing Company**  
556-558 West Monroe Street  
Chicago

and cut-off is provided. A flexible hose carries the oil from the pump to the intake valve in the head, the flow of oil being controlled by a two-way thumb valve conveniently located for the operator.

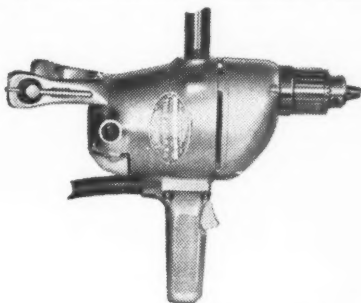
The machine is equipped with a built-in, lathe-type cut-off attachment operated by a ball crank handle and opposed by a V-block steadyrest to take the thrust of the tool and prevent breakage by "hogging in." A combination reaming and chamfering forming tool, mounted on the cut-off block, performs both operations simultaneously. The height of the No. 562 is 23 1/4 in.; width, 23 in.; length, 36 in., and net weight, 450 pounds.

## New Van Dorn Tools

Seven units in the line of tools made by The Van Dorn Electric Tool Co., 720 Joppa Rd., Towson, Md., have been redesigned for less weight, more compactness, and greater durability. These changes are in line with Van Dorn's policy of constant research and improvement.

Particular attention is called to the new 1/2-in. Utility Drill which is a full

3 1/4 in. shorter than the previous model, is 3 lbs. lighter in weight, and has perfect operating balance. Its close coupled construction, minimum spindle



Van Dorn Redesigned 1/2-In. Utility Drill

offset, and spade handle set horizontally are advantages in confined space. The spindle and bearing features which characterized the "Holgun" are also incorporated in this drill. These include a threaded chuck mounting, deep-groove ball bearing spindle bearing with inner and outer races locked in place, needle

## One Pound of CERROMATRIX SAVED THREE FULL DAYS ON THIS DIE

By securing the punches in Cerromatrix, the American Automatic Devices Company, of Chicago, saved three full days. This low-temperature-melting alloy expands slightly on solidifying, holding punch and die parts tightly and accurately. Used for long as well as short run dies. Also widely used for anchoring stationary machine parts quickly without the expense of a drive fit.

Send for booklet

**CERRO DE PASCO  
COPPER CORPORATION**  
44 WALL STREET, NEW YORK, N. Y.

BRITISH ASSOCIATES: Mining & Chemical  
Products Ltd., London, England  
CANADIAN REPRESENTATIVES: Dominion  
Merchants Ltd., Montreal, Canada



roller bearing at back end of spindle, splined mounting of spindle gear for increased strength and reduced noise and wear, and grease-sealed ball armature bearing. The  $\frac{1}{2}$ -in. Utility is powered with a universal motor which operates on either alternating or direct current.

The other redesigned units are the  $\frac{3}{8}$ -in. Heavy Duty,  $\frac{1}{2}$ -in. Utility,  $\frac{1}{4}$ -in. Heavy-Duty, and  $\frac{1}{4}$ -in. Heavy-Duty Electric Drills. In addition, there are two newly designed drill stands—the No. 20 and No. 40.

## Knock-Out A.C. Arc Welder

Having completed several years of experiment and test, K. O. Lee & Son Company, Aberdeen, S. D., has brought out the Knock-Out A.C. Arc Welder illustrated herewith. Features of the welder include trouble-free design, heat stage control, oversize transformer, efficient performance, rugged construction, and low operating cost.

There are no moving parts, no rheostat or snap switch, and thus nothing to wear out or give trouble. A heavy duty knife switch is the only piece



Knock-Out A.C. Arc Welder



**NEW**  
**Unbreakable**  
**OILERS**

**Modern! Streamlined!**

For maintaining a constant level of oil in ring or ball bearings, pump and gear housings, etc.

**WRITE FOR BUL. No. 25**  
**Trico Fuse Mfg. Co.**  
Milwaukee, Wis.

on the welder which is intended to be moved. Ten heat stages are provided the design being such that the ground and electrode holder cables are undisturbed when making heat changes. Secure and firm contacts are obtained and a separate control cable is provided for shifting from one heat tap to another. Practical operation has shown that 10 heat stages give adequate variation for all types of work. Straight holes with a spring pressure plug are provided for tap contacts, this design being said to provide for 100 per cent contact.

## Here's a Real Spring Winder!

- No. 1 Capacity 0 thru  $\frac{3}{32}$ " wire, \$1.25
- No. 2 Capacity 0 thru  $\frac{3}{16}$ " wire, 2.50
- No. 3 Capacity 0 thru  $\frac{5}{16}$ " wire, 5.00



### Will Earn Its Cost in One Day

The HJORTH Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

**HJORTH LATHE & TOOL CO. 12 BEACON STREET WOBURN, MASS.**

The po  
oversize  
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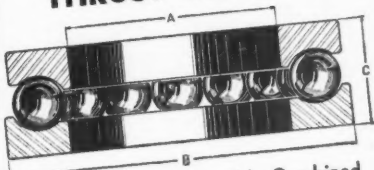
S

25

The power unit consists of a heavy oversize transformer with surplus copper and steel to assure safety, efficiency, and reserve power for continuous duty on the highest heat stage. The transformer delivers the amperage indicated for each heat tap and provides a smooth, steady flow of welding current. The secondary arc voltage is only 38 to 40 during operation and the maximum with an open circuit does not exceed 90 to 92. Utmost efficiency in ventilation is said to be provided by having cool air from the floor drawn up through the open bottom to circulate around and absorb the heat of the transformer, after which it passes out at top.

The welder case is simple and strong, the base being formed by heavy steel channels welded to the legs, and the dome and legs being of pressed steel. In operation, the welder is said to melt the rod and the parent metal together in a manner similar to that of the acetylene torch, without burning or blowing the metal. Performance is said to be the same from the very lightest metals to the heaviest castings, the smooth flow of current making the arc easy to strike and maintain, and it is said that the weld is strong, close-grained, and free of oxidation.

## G W I L L I A M THRUST BEARINGS



Type CC—Designed to Take Combined  
THRUST and LIGHT RADIAL LOADS

- Especially adapted for slow speed and heavy thrust duty, such as marine rudder posts and similar installations. To order only — any quantity.

OUR CATALOG ON REQUEST.

**THE GWILLIAM CO.**  
358 Furman St., Brooklyn, N. Y.

## Small Tools...

Long Length Drills  
Special Size Taps  
Carried in Stock

High speed and carbon drills, taps, reamers, milling cutters, hollow mills, end mills, drill rod, die sets, etc. . . .

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(INCORPORATED)

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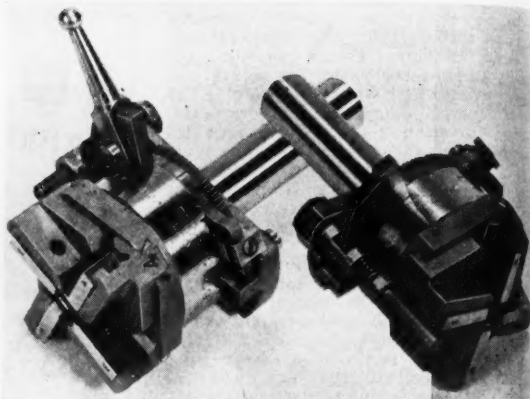
NEW YORK CITY

## J&L Model 16S and Model 16SB Die Heads

The Jones & Lamson Machine Company, Springfield, Vt., announces two new die heads — the 16S and 16SB. The Model 16S die is designed for use on small hand screw machines, and is provided with an adjustable pull-off and a hand locking lever.

The Model 16SB die has an external trip and is recommended for use on No. 0 and No. 00 Brown & Sharpe Automatics. This die is designed so that it cannot open during the indexing movement on high speed machines.

The Models 16S and 16SB dies are of the same general construction as the J&L Tangent Dies except for the chasers, which, although of the flat type, are equivalent in section to a tangent chaser. Both the top and bottom of



(Left) Model 16S J&L Die Head. (Right) Model 16SB J&L Die Head.

the chasers are provided with chamfer and top rake. After they become dull on the top, they may be turned over, making them equivalent to two sets of ordinary radial type chasers. The chasers are ground in the thread form after hardening. Each chaser is secured to the chaser-holder by a single screw which forces it against two ground surfaces. The chasers may be resharpened.

## RIVETERS

• Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles.

*Write for literature—and don't forget to send samples.*

**THE GRANT MFG. & MACHINE CO.**  
96 SILLIMAN AVE.

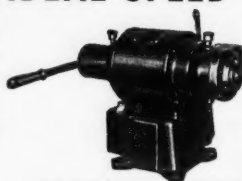
BRIDGEPORT, CONN.

## "Collapsi-Bin"

An all-steel work container combining in a single unit three distinct types of work-handling equipment—a bin, a rack, and a pallet—has been announced by Mechanical Handling Systems, Inc., 4700 Nancy Ave., Detroit, Michigan.

Designed so that it can be used as a shipping container as well as for

## IDEAL SPEED LATHES



FOR LAPPING  
FINISHING  
POLISHING  
SMALL PARTS  
2 Speed Motor.  
Automatic Brake  
Collet or 3 Jaw  
Chucks. Hand  
operated or automatic. Write for  
Circular 380.

**SCHAUER MACHINE CO.**

2060 READING ROAD • CINCINNATI, OHIO

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Left an  
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Round  
Cone



August



inter-department transit or for storage purposes, thus eliminating duplicate handling, crating, and so on, the unit is of heavy duty construction with a capacity for 8,000 lbs. The "Collapsi-Bin" has a base frame of square steel tubing integral with which is a steel plate to form a smooth surfaced pallet. Left and right side panels of corrugated steel have corner posts of steel tubing which extend downward to nest inside the legs of the skid, forming a rack. End panels, also of corrugated steel, reinforced with an angle steel frame, form a secure joint with the side panel corner posts through a fool-proof self-locking device to complete the set-up as a bin for carrying small parts.

Steel pins, at the bottom of each panel and engaging holes in the skid plate top and frame, serve to firmly anchor each panel at two points between corner pillars. Lugs, fastened to corner posts, provide an additional brace for the end panels as well as relieving the locking device of heavy strains. Steel shoes are attached to the legs of the "Collapsi-Bin," preventing damage to floors when heavy loads are being handled.

When used as shipping containers,

- No Mushrooming ►
- No Chipping ►
- Oversize Shanks ►
- Exclusive Knurled Back ►
- Exclusive Thumb Grip ►
- Broach-Rounded ►
- Corners

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Write for Price and  
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**NEW METHOD STEEL  
STAMPS, Inc.**

149 Joseph Campau, Detroit

August, 1939



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**DRILL BUSHINGS FOR**

**GREATER Accuracy!**

Rigid standards of manufacture and Super-finishing of the bore insures the greater accuracy of Universal Drill Bushings — identified by black dome.

# UNIVERSAL

**Engineering Company  
Frankenmuth, Mich.**

MODERN MACHINE SHOP 171

"Collapsi-Bins" can be stacked on top of each other for maximum saving in space by use of nesting plugs which slip into the top of each corner post and into the legs of the "Collapsi-Bin" immediately above.

A shipping economy feature lies in the fact that side and end panels of "Collapsi-Bins" may be slipped out and nested flat on top of the skid when being returned empty, thus saving two-thirds of the space normally required.

Standard size "Collapsi-Bins" measure approximately 3 ft. wide by 5 ft. long. The 40-in. height allows for well over



"Collapsi-Bin"

2 ft. in depth of the bin. Height to the top of the base plate with panels removed is 14 in. Due to simplicity of design and construction, "Collapsi-Bins" are readily available in any required sizes other than standard without material increase in cost.



**TANNEWITZ**

**24" HI-SPEED BAND SAW**

Saws Nearly Everything Including Wood, Sheet Steel, Brass and Aluminum Casting Gates, etc. 1½ H.P. Direct Motor Drive.

Also 30"-36"-42" Sizes.

**TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN**



**Free Cutting!  
Non-Glazing!  
Abuse Proof!**

**New WTTCo  
Diamond Impregnated  
WHEEL DRESSER**

Whole, unbroken diamonds of high quality and extreme toughness are spaced regularly throughout the matrix to give great accuracy, uniform dressings and to hold wheel to size. These stones are anchored permanently in their matrix by strong chemical bonds that will not break under heat, pressure or rough abuse. No remounting! Lowered production costs!

*Send for literature and prices.*

**WHEEL TRUING TOOL CO., INC.**  
3200 W. Davison • Detroit

**B & S No. 0A Change Gear Guard for Drive to Universal Spiral Index Cutters**

Similar to the Nos. 0, 2 and 3 Guards announced previously by the Brown & Sharpe Mfg. Co., Providence, R. I., this guard completely encloses the gearing

**YOU'LL SAVE  
TIME**

AND TROUBLE . . . BY  
SPECIFYING NATIONAL  
TWIST DRILLS, HOBS,  
REAMERS . . . MILLING  
CUTTERS, Special TOOLS



**NATIONAL TWIST DRILL AND TOOL CO.**  
DETROIT, U. S. A.

Top and Die Division, WINTER BROS. CO., Wrentham, Mass.  
Factory Branches: New York, Chicago, Philadelphia, Cleveland  
Distributors in Principal Cities

which drives the headstocks of the Universal Spiral Index Centers used on the Brown & Sharpe No. 0 Universal Milling Machine.

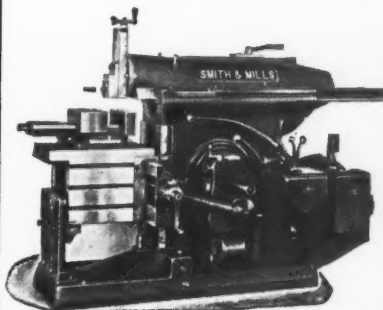
Made of aluminum alloy for lightness and ease of handling, the guard is quickly placed in position or removed from the machine. It is attached to the table by two screws.

The full set of change gears furnished with the machine can be used and the hinge cover swings wide to allow full freedom in changing the gears. Hand adjustment of the headstock is made by means of a handcrank inserted through a hole in the guard which is kept closed once the gears are set up.

### Weltronic Model 90-53 Timer and Contactor

To make possible the definite timing of welds, whether made by hand or foot-operated spot welder, the Model 90-53 Timer and Contactor shown in the illustration has been developed by Weltronic Corporation, 2832 E. Grand Blvd., Detroit, Mich. The use of this instrument is said to open up a new field of welding for the small welder,

## SMITH & MILLS SHAPERS

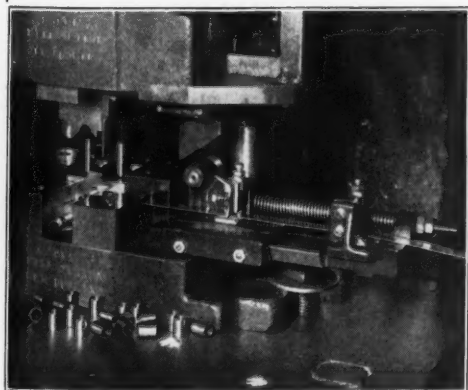


Automatic lubrication—forced feed. Multiple disc clutch and brake. Quick feed changes. Direct reading feed and stroke dials. Power rapid traverse to cross feeds.

**THE SMITH & MILLS CO.**  
CINCINNATI OHIO

## DICKERMAN HITCH FEED

For Quicker Set-ups on Short Runs  
*Accurate - Economical - Adaptable*



The Hitch Feed is adaptable to any ordinary punch press without press alterations. It is built to feed from any position on any style die.

In cases where the Hitch Feed is permanently attached to the die-set, the set-up time of the die and Hitch Feed is no longer than that of the die alone.

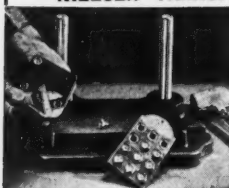
Left: Dickerman Hitch Feed mounted in the usual right-hand position feeding a cut-off-and-form die.

*Write for folder No. 84.*

**H. E. DICKERMAN  
MANUFACTURING CO.**

284 WILBRAHAM RD.  
SPRINGFIELD • MASS.

### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduces time and eliminates spoilage of other methods. • 7 Sizes U. S. S.—Inexpensive—Last for years.

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**NIELSEN TOOL & DIE COMPANY**  
1863 Gardner Ave. Berkley, Mich.

### ALL ALLOY FULLY GUARANTEED PORTABLE SHEARS



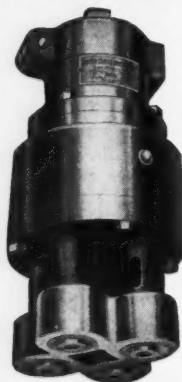
Two Sizes

No. 1 cuts up to No. 11 gauge strip or sheet.  
No. 2 cuts up to 1/4" steel plate.

Special Blades for shearing stainless steel.

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## 4 TIMES AS FAST



• This U. S. Multiple Drill Head drills four heads at once . . . does your drilling job 4 times as fast. With other U. S. heads, as many as 50 holes can be drilled at one time. Let us show you how to save money on special jobs.

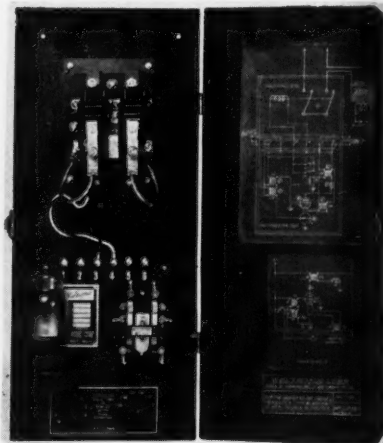
Send blue prints  
for estimates.

**The United States Drill Head Co.**

1954 Riverside Drive  
CINCINNATI, OHIO

making it possible to weld stainless steel, aluminum, or brass, with the maximum assurance of a good weld.

The instrument is of compact design, with removable contacts. Oil and heat-resisting wire is used throughout and all timer circuits are color-coded. The terminal strip is easily accessible and contacts can be removed. A spring hinge corner is also a feature of this instrument. The instrument is made for voltages of 110, 220, and 440, for frequencies of 25, 50, and 60 cycles.



Weltronic Model 90-53 Timer and Contactor

Operating on the standard timing range, the weld time is 4 to 40 cycles and on the special timing range, the weld time is 1 to 60 cycles.

A complete electrical diagram is included with each timer, showing how to connect the timer to the machine. The Weltronic Timer and Contactor can be installed by anyone familiar with the machine on which it is to be used.

### B. & D. High Speed Hole Saws

A line of high speed hole saws has been placed on the market by The Black & Decker Mfg. Co., 720 Pennsylvania Ave., Towson, Md. These hole saws are used in 1/2 in. or larger electric drills to increase their capacity for cutting clean, round holes in any material that a hack saw will cut. The addition of high speed hole saws com-

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cycles.

pletely rounds out the Black & Decker line with three types: fine tooth for sheet metal, steel, and all thin materials; coarse tooth for cast iron, wood, fibre, and all thick materials, and the

new high speed for hard alloys and production work.

Of particular interest to many users is a new mandrel for  $\frac{1}{4}$  and  $\frac{3}{8}$ -in. drills which can be used to drive hole saws up to  $1\frac{1}{2}$  in. in diameter. Heretofore hole saws could be driven only by  $\frac{1}{2}$ -in. or larger drills.

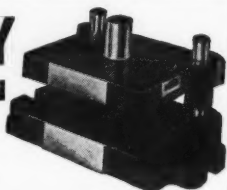
Hole saws are adaptable to a variety of uses such as installing car heaters, radios, clocks, and so on; relief drains



B. & D. High Speed Hole Saws

in soil lines; attaching hot water heaters to boilers; running new pipe lines or electrical conduit through floors and walls; installing oil burners, stokers, and automatic blowers in furnaces; setting new dials in instrument panels, and other hole-cutting applications.

## DANLY PRECISION DIE SETS



**Danly All-Steel Sets**  
**Danly Commercial Sets**  
**Danly Die Makers' Supplies**

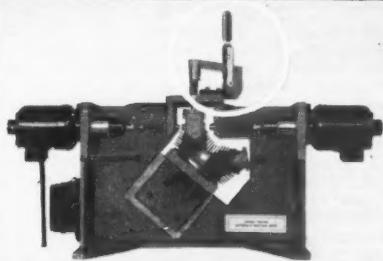
### DANLY SERVICE

8 Danly Warehouses Provide  
24-Hour Service for 85% of  
All Metal Fabricating Plants

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**DANLY** DIE MAKERS'  
SUPPLIES



AS USED ON AIRCRAFT ENGINE FIXTURE

## KNU-SINE TOGGLE CLAMPS

These toggle action clamps provide the fastest and yet most inexpensive method of locating parts in dies, jigs, and fixtures. Automatically lock into position, instantaneous release, hundreds of possible applications.

Ces appareils bloquent et desserrent instantanément. Ils trouvent leur emploi dans de nombreuses opérations de soudage, de perçage, d'alésage, d'assemblage et permettent de supprimer ou de simplifier les montages spéciaux utilisés pour ces opérations. Indispensables pour tous travaux de série exigeant un assujettissement rapide et énergique des pièces.

Die in obenstehendem Bilde gezeigten Kniehebelsätze sind für sehr vielseitige Verwendungszwecke bestimmt, wie z.B. für das Festhalten von Blechteilen während der Ausführung von Schweissarbeiten, ferner für das Einspannen von Fertigungsstücken während des Bohrens, Gewindeschneidens und ähnlicher Arbeitsgänge.

Ask for catalog and new reduced prices.

MFD. BY

**KNU-VISE Inc.**

6434 CASS AVE.

**DETROIT, MICH., U. S. A.**

SALES AGENTS THROUGHOUT THE WORLD

## "Liftug"

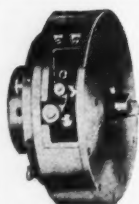
Paramount Equipment Co., 909 E. First St., Tulsa, Okla., has placed on the market a device known as the "Liftug" which is designed to lift or pull from any direction. It has only five working parts, is sturdily built, and is light in weight. The Liftug is made of steel, alloy steel, and "Certified" malleable iron, and is available in various sizes and capacities.

It is said that one of the most important design features of the Liftug is the fact that the power on the lever

is transmitted directly to the chain thereby eliminating loss of power through friction in the machine. The lever, chain, and sprocket move through their respective arcs of travel without friction upon each other. Two pawls func-



"Liftug"



## M-D Facing Heads

With Automatic Feed

Can be attached to Column Boring Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically and covers faces 6" to 30".

Write for circular.

**MUMMERT-DIXON CO.**  
120 PHILADELPHIA ST., HANOVER, PA.

## GEARS

**Good Gears Only**

**All Kinds**

**Any Quantity**

**AT THE RIGHT PRICE**

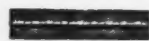
**THE CINCINNATI GEAR CO.**  
1825 Reading Road Cincinnati, Ohio

tion directly upon the chain, catching each link in lifting and lowering the load. These pawls lock on the chain under load stress and cannot be released until a lever tension has been applied, thus keeping the load under control at all times. The chain will move forward freely when taking up surplus, and by a short movement of the thumb latch, it can readily be re-strung for taking another hitch.

The body of the Liftug is fitted with a universal connecting hook, allowing for quick attachment and free movement in any direction. All chains are fitted with swivels and hooks.

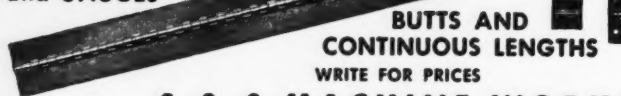
## Planer Slot Cleaner Free

A planer slot cleaner for removing the metal chips from the table slots of milling machines, planers, and other



## HINGES

**VARIOUS WIDTHS**  
**and GAUGES**



**BUTTS AND**  
**CONTINUOUS LENGTHS**  
**WRITE FOR PRICES**

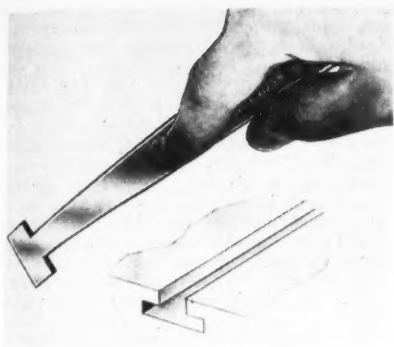
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**CASES**  
**BOXES**

## S & S MACHINE WORKS

**4541 W. LAKE STREET HARDWARE DIVISION CHICAGO, ILLINOIS**



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fric-  
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Planer Slot Cleaner

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Fig. 1434 Knurled  
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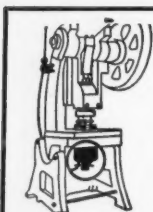
Chicago  
St. Louis  
San Francisco

the cleaner in the tool crib, or the cleaner may be chained to the average machine tool, ready for use.

## New Books

**Pattern Making.** By James Ritchey. Revised by Walter W. Monroe, Charles William Beese, and Philip Ray Hall. Published by American Technical Society, Drexel Ave. at 58th St., Chicago, Ill. 233 pages, 350 illustrations. Cloth binding. Price, \$2.00.

This book aims to cover fully the



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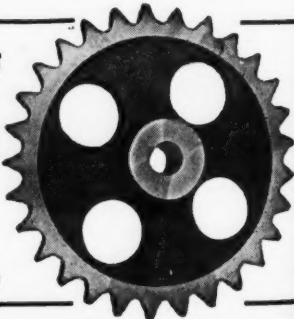
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subject of pattern making, describing the tools and equipment necessary, the design details of simple and complicated patterns for typical cases, the use of green and dry sand cores, and finally the construction and design of typical molding machines with details as to the manner in which the castings are designed to suit the machine.

Beginning with a discussion of the woods and metals used in pattern making, the authors take up the various wood tools used, machining tools, small tools, machine tools, molding practice, the different types and kinds of patterns, finishing with a general exposition of the art of metal pattern making. The book should be found of distinct practical value in its field.

**Foundry Work.** By William C. Stimpson and Burton L. Gray. Revised by John Grennan. Published by American Technical Society, Drexel Ave. and 58th St., Chicago, Ill. 216 pages, 148 illustrations. Price, \$2.00.

In this book the subject of molding practice has been carefully discussed, including the many questions of pattern construction which are more or less closely associated with foundry work. The presentation also includes a number of typical molding problems and likewise the uses of the various types of molding machines which have become so popular within the last few years. Casting operations, including materials, melting and pouring equipment, metallurgy of cast metals, non-ferrous castings, and all other operations dealing with casting are thoroughly explained. Altogether this book represents a well-rounded, clearly written, and thoroughly up-to-date discussion of foundry work and practice.

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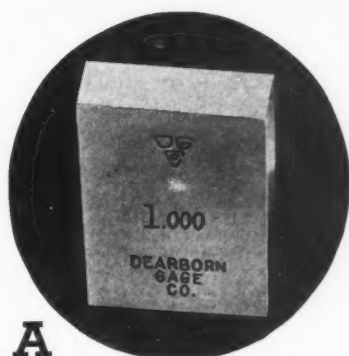
## Free Literature

**"Standard" Precision Grinders.** The Standard Electrical Tool Company, 8th and Evans Sts., Cincinnati, Ohio, has published Bulletin No. 162 covering its recently developed line of Type BPA Precision Internal-External Grinders. Illustrations and complete information on this equipment, which is designed for application to the lathe, planer, milling machine, and so on, are contained in the bulletin. Belt drive and spindles mounted in precision bearings are featured. Copy free upon request.

**Tap and Die Information.** A book of information on taps, dies, thread forms, thread dimensions, and other facts pertinent to the use of taps and dies, indicated as Catalog No. 18, is now being distributed by Winter Brothers Company, Wrentham, Mass. The first part of the book is devoted to descriptions, illustrations, and specifications of the various types and kinds of hand and machine taps, dies, pipe reamers, combination pipe, taps and drills, tap wrenches, die stocks, and screw plates made by this firm.

The latter half of the book is devoted to useful information and commercial standards tables. In this section will be found a compendium of tap and thread terms, a discussion of lead and lead error, speed of operation and lubrication, tap drill sizes, and a set of tables of dimensions of all kinds of taps. Included also are the dimensions of American National forms for cut threads, commercial ground threads, and precision ground threads, together with tables of basic thread dimensions and tap drill sizes for American National form threads, Whitworth form, British Association standard, French and International standard, American National Acme screw threads, and American National pipe threads. The book contains 144 pages 6 x 9 in. in size. Copy free to any mechanical engineer or plant executive.

**Rex High Speed Steels.** The Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y., announces the publication of an eight-page folder covering its seven grades of Rex high speed steels. Instructions for cutting, forging, annealing, hardening, tempering, and straightening Rex high speed steels are included in the folder. Copy free upon request.



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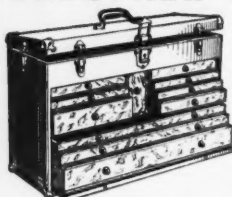


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**Bergram Utility Grinders.** A bulletin discussing Bergram Utility Grinders has been issued by Bergram Mechanical Engineering Co., Inc., 18 Hartford Ave., New Britain, Conn. Among the grinders illustrated and described are the Type EMS-1, adapted principally for grinding the land, relief, and teeth of straight, spiral or tapered reamers, end mills, shell mills, and cutters; Type FG-1, designed especially for hollow grinding the flutes of end mills, reamers, cutters, taps, and form tools either spiral or straight, and Type TRS-1, for grinding the land, relief, and teeth of straight, spiral, or tapered reamers with up to 8-in. length of flute, end mills, shell mills, and cutters. Complete specifications for each type grinder are included.

A companion folder illustrating and describing the Bergram Production Surface Grinder Type SG-1 has also been issued. Copy of bulletin and folder free.

**Deckel FPI Universal Tool Milling Machine.** H. P. Preis Engraving Machine Co., 155 Summit St., Newark, N. J. American agents for the Deckel Milling Machine, is now distributing a 70-page catalog describing and illustrating this machine and presenting a variety of standard and special jobs that can be done with this machine. The book is divided into three sections; the first being devoted to the individual production of molds, gages, jigs and tools, apparatus and machine parts, the second section presenting the Deckel Milling Machine as applied to the series production of machine parts and tools, and the third part presenting the uses of this machine in punch milling. The book is profusely illustrated with photographs and drawings, and each illustration is accompanied by adequate description. Copy free upon request.

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**Gisholt Performance Data.** A clipper binder containing Gisholt performance data sheets has been prepared by the Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis. These data sheets show how Gisholt Machines lower manufacturing costs, increase production, and permit more profitable operations. The data sheets also include actual photographs of Gisholt machines at work on regular as well as unusual machining jobs, and outline the problems, telling how each was solved. Tool layouts illustrate how the jobs were set up and the various operations are described, giving speeds, feeds, and time required.

In addition, the sheets contain many valuable suggestions that will aid in solving some of the questions encountered daily in metal manufacturing plants such as using turret lathes more efficiently on small lot jobs, better use of standard tools, where special tools are desirable, how set-up times can be reduced, procedure and balancing of rotating parts, how turret lathe production can be increased, and so on.

Copy of Gisholt Performance Data Binder will be sent free to any foreman, production engineer, superintendent, or plant manager who will address a request on his company letterhead; each month additional performance data sheets which can be filed in the binder will be supplied.

This data should be invaluable to the tool engineer, planning engineer, or production executive.

**"The Travels of Modern Lubrication"** is the title of an interesting booklet which shows, through generous use of photographs, the many different kinds of machines in which Bijur Automatic Lubricating Systems are used. The machines include spinning frames, printing presses, lathes, looms, power presses, compressors, business machines, food machines, bolt and nut machines, grinders, hobbing and boring machines. A copy of this booklet can be obtained by any mechanical executive who will address a request to the Bijur Lubricating Corporation, Long Island City, N. Y.

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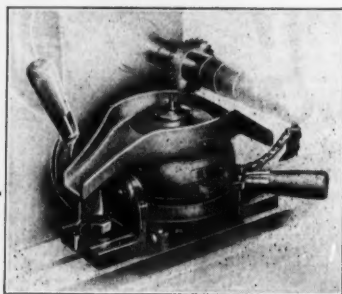
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**Allegheny Stainless Steels.** Joseph T. Ryerson & Son., Inc., 16th and Rockwell Sts., Chicago, Ill., announces the publication of a booklet entitled "Allegheny Stainless Steels," which pictorially illustrates the unlimited possibilities of stainless steel for consumer products and industrial applications. Included in this booklet is a brief summary of Allegheny Stainless products carried in stock by Ryerson for immediate shipment. Copy free upon request.

**Allis-Chalmers Leaflets.** Leaflet No. 2183-A entitled "Lo-Maintenance Direct Current Motors and Generators" has been released by Allis-Chalmers Manufacturing Co., Milwaukee, Wis. The motors and generators are described and illustrated, and details of construction are explained.

"Explosion-Proof Motors," a special leaflet designated as No. 2125-C covering motors that give protection in explosive - fume - laden atmosphere, has also been released by Allis-Chalmers. It includes numerous construction and installation views, showing Allis-Chalmers Explosion-Proof Motors in a variety of dangerous applications.

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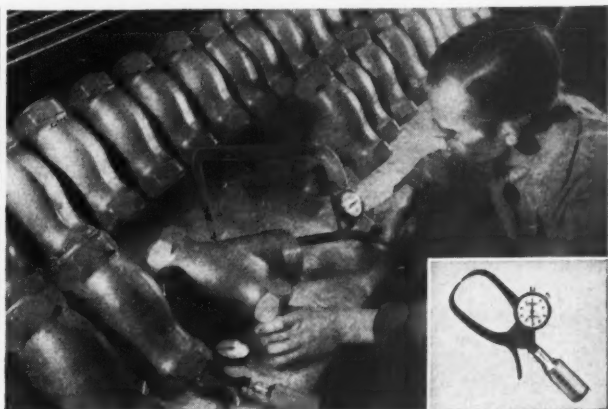
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**Janette Dynamotors.** Bulletin 14-25 intended for insertion in Janette folders is now being distributed by the Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill., illustrating and describing several different types of Janette dynamotors for use as a power supply for signal systems; low voltage lamps, plate supply for radio apparatus, radio telephones, testing purposes, and so on. Copy free upon request.

**"Meehanite — The Metal for Pump Castings."** Meehanite Research Institute announces the publication of an eight-page illustrated booklet, Form 100, entitled "Meehanite — The Metal for Pump Castings." The booklet describes and illustrates various adaptations of Meehanite to pumps faced with severe service requirements. In addition, results of recent cavitation tests on different types of Meehanite are included. The booklet will be mailed free upon request to the Advertising Department, Meehanite Metal Corporation, Vandergrift Bldg., Pittsburgh, Pa.

**Auburn Ball Bearing Catalog No. 10.** Ball thrust bearings are the subject of a 24-page catalog prepared for distribution by the Auburn Ball Bearing Co., 69 Clarissa St., Rochester, N. Y. In addition, the catalog illustrates and describes double thrust ball, special ball thrust, radial ball, and cup and cone bearings. Several pages are devoted to tables giving bearing sizes and to Auburn bearing installation and applications. Copy free upon request.

**Philadelphia Motoreducer Bulletin MR 38.** Designated as a bulletin, this piece of literature is more strictly speaking a catalog containing 48 pages, 8½ x 11 in. in size, describing and illustrating the open type, totally enclosed fan-cooled horizontal, splash proof, explosion proof, vertical, and other types of Motoreducers made by Philadelphia Gear Works, G St. and Erie Ave., Philadelphia, Pa. In addition to the descriptions, photographic illustrations and tables of specifications, included also are drawings printed in blue to simulate blue prints to aid the reader in selecting the type of equipment best suited to his needs. Copy free upon request.



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**Whitney Woodruff-Type Keys and Cutters** is the subject of an eight-page catalog now being issued by The Whitney Chain & Mfg. Co., Hartford, Conn. The first part of the catalog is devoted to the discussion of the Woodruff system of keying and to drawings giving profile dimensions of Whitney Woodruff-Type keys. The second part includes tables giving Woodruff key, keyseat, key above shaft, keyway, and keyseat cutter dimensions. Copy of Catalog V-111 free upon request.

**Johnson Ledaloyl Bearing Bronze.** Catalog L-1 now being distributed by Johnson Bronze Company, 590 S. Mill St., New Castle, Pa., comprises a complete listing of the stock sizes in which Ledaloyl Self-Lubricating Bronze Bearings and Bushings are now available. Prices and complete installation data are also given. One section is devoted to facts about Ledaloyl—lead content, uniform structure, load-carrying capacity, and contraction and expansion. Copy free upon request.

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*To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.*

1. **Collet Chucks**  
A new bulletin featuring Universal Collet Chucks has been released by Universal Engineering Co., Frankenthum, Michigan.
2. **Ball and Roller Bearings**  
New Catalog No. 16 describes the Gwilliam line of Ball and Roller Bearings and contains illustrations of various types with lists of standard sizes. The Gwilliam Co., Brooklyn, New York.
3. **Taps, Dies and Screw Plates**  
A new 144-page catalog No. 18 featuring Winter Brothers Taps, Dies and Screw Plates has just been published by Winter Brothers, Wrentham, Massachusetts.
4. **Factory Equipment**  
The Cleveland Wire Spring Co., Cleveland, Ohio, has available new Catalog No. 33, featuring Steel Shop Boxes, shop kegs and pails, annealing pans, drying pans, lathe pans, waste cans, stools, steel tool and supply racks, shelving, coiled wire and flat springs and formed wire specialties.
5. **Automatic Thread Grinding Machine**  
Jones & Lamson Machine Co., Springfield, Vt., has published an attractive 18-page catalog featuring the J & L Automatic Thread Grinding Machine.
6. **Gear Shaping**  
"The Practical Art of Generating" is the title of a 64-page booklet issued by The Fellows Gear Shaper Co., Springfield, Vermont.
7. **Tapping Attachments**  
Catalog T-5, issued by The Chas. L. Jarvis Co., Middletown, Conn., shows tapping attachments ranging from No. 2 to 2" capacity.
8. **Spring Data Sheet**  
Helpful data sheet featuring stock springs in 234 sizes ranging in length from  $\frac{1}{4}$ " to 24"; in diameter from  $\frac{1}{8}$ " to  $\frac{1}{4}$ "; in wire size from .016 to .500. Hardware Products Co., 105 Richmond St., Boston, Mass.
9. **Bulletin 2730-D**  
Featuring New Buffalo No. 16 Overhang Sensitive and Power Feed Drilling Machines, 8", 12" and 15" overhang, has just been issued by Buffalo Forge Co., 388 Broadway, Buffalo, New York.
10. **Universal Vise**  
Complete details on the Wesson Universal Vise are outlined in illustrated folder released by Wesson Co., 1050 Mt. Elliott, Detroit, Michigan.
11. **Shop Boxes**  
Lyon Metal Products, Incorporated, 1307 River St., Aurora, Ill., has available bulletin featuring Lyon's complete line of shop boxes.
12. **4-Speed Drive**  
Details on the Schultes 4-Speed Drive for milling machines, shapers, lathes, drill presses, planers, punch presses, slotters, etc., are contained in bulletin now available. Westlof Tool & Die Co., 430 Bellevue Ave., Detroit, Michigan.
13. **Automatic Saw Sharpener**  
Details on the Wardwell No. 35T Sharpener for automatically sharpening metal saws in gangs are available from The Wardwell Mfg. Co., 3166 Fulton Road, Cleveland, Ohio.
14. **Hitch Feed**  
Folder No. 84 illustrates and describes the Dickerman Hitch Feed which is adaptable to any ordinary punch press without press alterations. H. E. Dickerman Mfg. Co., 284 Wilbraham Road, Springfield, Massachusetts.
15. **Drill Chucks**  
Folder 100, released by Scully-Jones & Co., 1913 S. Rockwell St., Chicago, Ill., illustrates, describes and lists

prices on "Feed as you need" Chucks.

**16. Shim Application Chart**

This new chart, just released, contains a comprehensive survey of proved applications for laminated shims and shim stock. Laminated Shim Company, Inc., 21-86 Forty-fourth Ave., Long Island City, New York, N. Y.

**17. Steel Bending Brakes**

Dreis & Krump Mfg. Co., 74th St. and Loomis Blvd., has issued a handy catalog featuring the line of Chicago Steel Bending Brakes.

**18. Rexalloy Tool Bits**

An interesting booklet on Crucible Steel Company's new non-ferrous cutting alloy, now available in tool bit form. Examples of increased speeds and deeper cuts made possible with Rexalloy are shown. It's booklet TS400. Crucible Steel Company of America, 405 Lexington Ave., New York, N. Y.

**19. High Speed Grinders**

Themac High Speed Portable Electric Precision Grinders are illustrated and described in a new circular released by The McGonegal Mfg. Co., East Rutherford, N. J.

**20. Woodruff Type Keys and Cutters**  
Catalog V-111, issued by The Whitney Chain and Mfg. Co., Hartford, Conn., completely details Whitney Woodruff Type Keys and Cutters.

**21. Coated Abrasive Papers and Cloths**

A useful catalog and price list chock full of useful information on coated abrasive papers and cloths has just been issued by Abrasive Products, Inc., South Braintree, Mass.

**22. New Sine Angle Plate**

The New Kar Sine Angle Plate which incorporates improvements over earlier models, is detailed in a new bulletin. The Kar Engineering Co., Inc., 200 Hudson St., New York, N. Y.

**23. Roller Chain Catalog**

The Baldwin - Duckworth Chain Corp., Springfield, Mass., has just issued Catalog M, which lists and describes the company's complete line of single and multiple strand roller chains, sprockets and specialties. Other items are also featured.

**24. Surface Grinding Machine**

Circular D-B-2 illustrates and describes the Walker Single Stroke Surface Grinding Machine, Model D-B. O. S. Walker Co., Inc., Worcester, Massachusetts.

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## Centerless Grinding (CONTRACT WORK)

Precision, Accuracy, Promptness

Let us quote on your specifications.

### THE HEIM COMPANY

Fairfield • Connecticut

## DIES, JIGS AND FIXTURES

Large or Small Designed and Built. Com-  
mercial Jig Boring at reasonable prices.  
Prompt service. Let us quote.

### QUALITY TOOL & DIE CO.

403 N. Noble St. Indianapolis, Ind.

RAY W. RICE, Mgr.

## CENTERLESS GRINDING

Straight—Tapered—Double Diameter

Shoulder and Profile Diameter

Internal Grinding—External Grinding

Taper and Straight Dowel Pins Made to Order

Screw Machine Products Heat-Treated

Before Grinding If Necessary

### Industrial Centerless Grinding Co.

14640 Schaefer Road Detroit, Mich.

## SCREW MACHINE PRODUCTS

We are equipped to make parts requiring  
two or more second operations. Some  
second operations can be done on the  
bar at great savings.

### Northwest Automatic Products Corp.

138 Holden St. Minneapolis, Minn.

## AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

...up to 2 1/4" diameter—any material—  
small or large quantities. Prompt service.

### IMSAND SCREW PRODUCTS CO.

3317 CARDIFF AVE., OAKLEY, CINCINNATI, O.

## GRIND THE EASTERN CENTERLESS WAY

Accuracy—Fine Finishes—Low Cost

Large or Small Lots

### EASTERN CENTERLESS GRINDING CO.

628 Capitol Ave. • Hartford, Conn.

## CENTERLESS GRINDING

Since 1925

### CINCINNATI

### ICE PICK & TONG MFG. CO.

118 BURROWS ST. • CINCINNATI, O.